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SEPTEMBER 1972

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MECCANO®
Magazine

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CONTENTS

ON THE EDITOR'S DESK 425
What's going on?

LAND SAILING 426
—with radio control land yachts

BELOVED TEDDY BEAR 427
Australia's Koalas

BLUE RIBAND FUTURE 429
What will happen to the trophy?

NEW DINKY MILITARIA 430
Latest Dinky Toy releases

A RIVETING SITUATION 432
Making a Meccano riveting machine

SEA HIGHWAY? 435
The proposed Morecambe Bay Barrage

TAKING ICEBERGS IN TOW 437
Fresh water by the mile

ENVIRONMENTAL STAMPS 439
All help the anti-pollution fight

EXPOSING TRAINS 440
Photographs with a difference

AMPHIBIAN 441
Electric-powered, full-size plan

AMONG THE MODEL-BUILDERS 444
More intriguing mechanisms

MECCANO PARTS 446
And how to use them, Part 9

BRIDGE DESIGN 448
Part 8—Early Suspension Bridges

BRITAIN'S STRANGEST LIGHTHOUSE 450
The "mystery tower"

AIR NEWS 452
Current aviation topics

MOBILE TOWER CRANE 455
A model from a No. 7 set

HAVE YOU SEEN? 458
What's new in the shops?

FRONT COVER

We don't know who the lovely young lady is, but the models are radio-controlled (or sand) yachts from George Siposs in California.

NEXT MONTH

The R.A.F. Musuem, windmills, and a study of pollution are three interesting articles scheduled for our next issue.

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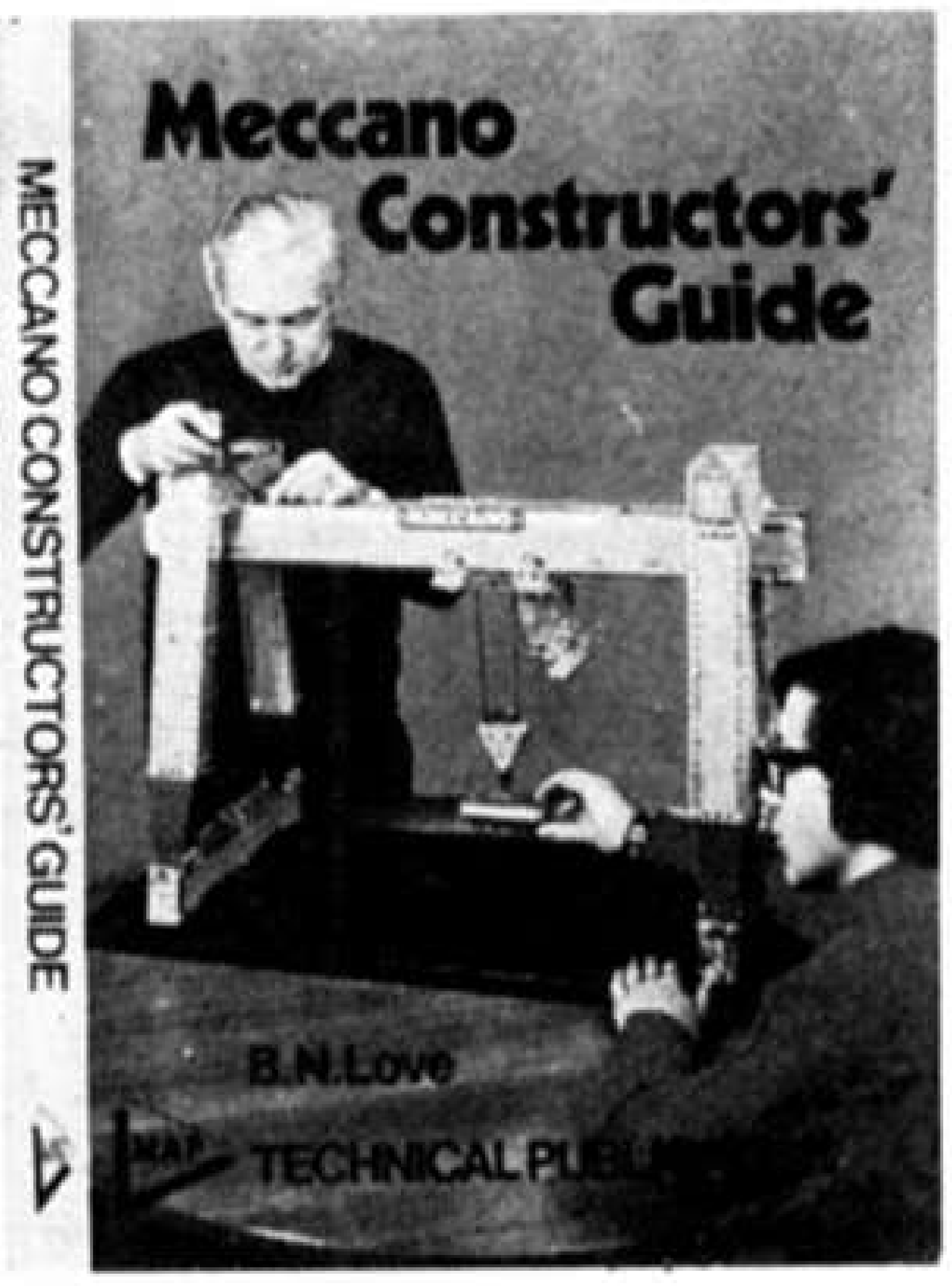
165 MECCANO CONSTRUCTORS' GUIDE



Bert Love, whose name will be familiar to readers of Meccano Magazine, provides a wealth of useful information and ideas for both beginner and expert constructor alike in this fine new work which represents an edited edition of his series of 12 articles in Meccano Magazine. Chapter headings include Basic Construction, Pulleys, Sprockets and Gears, Basic Cranes, Winding Gear, Rotating Superstructures, Movement on Rails, Traction Engines, Crawler Tracks, Vehicle Mechanics and Electrical Circuits for Motors and Lights, covering in detail every possible use and application of this versatile medium.

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The Birthday Present

Exactly one year after the deHavilland aircraft organisation came of age, September 25th 1942, four of their then unknown Mosquitos from 105 Squadron, gave Norway a birthday present.

Led by Squadron Leader D. A. G. Parry, D.S.O., D.F.C., the Mosquitos left Leuchars in Scotland bound for the Gestapo Headquarters in Oslo. Their mission was threefold. First: to disrupt a rally due to be held there and which would be attended by Vidkun Quisling. Secondly: to destroy as many documents, traitors, collaborators and Gestapo personnel as possible. Thirdly, and perhaps most important of all: to give a much needed boost to Norwegian resistance morale.

There was a further reason why Mosquitos were chosen for this particular raid. The low level day bombing attacks employed by the Mosquito Squadrons had not, until this point in time, yielded many spectacular successes. Its whole future as a day bomber was therefore being hotly criticised at top defence command levels. The Oslo raid helped to swing opinions over towards the Mosquito's retention in the role for which it had been specifically designed.

The Mosquitos flew at sea level, in order to deceive enemy radar, and were given to expect full cloud cover at 2,000 feet and no enemy aircraft. Their expectations were not fulfilled. They met with cloudless skies and Focke Wulfe 190's.

Four Mosquitos attacked the target in pairs, Squadron Leader Parry and Pilot Officer Rowlands leading. They flew over Oslo at rooftop height towards the headquarters – easily discernible due to the large dome and Nazi flag surmounting the building. One enemy aircraft engaged the leaders and two more 190's dived hard on the second pair. Flt. Sgt. Carter's aircraft had fallen slightly behind and was hit badly – with a FW 190 on his tail and one engine blazing, he turned towards Sweden, only to crash in a lake – his aircraft was subsequently salvaged by the Germans. The others bombed the target with an accuracy which captured the imagination of both the Norwegians and the British.

At least 4 bombs entered the roof of the Gestapo buildings before the 3 remaining Mosquitos turned and streaked home along the valleys of Norway. The pace was fantastic; and indicated air speed of 330 mph; with the Mosquitos steadily drawing away from the fighters. One of the chasing 190's crashed near Oslo and the pilot was killed. At the time rumours circulated that it had been shot down by a Mosquito – an impossibility since these Mosquitos did not carry any armament and were originally designed to rely on speed as their main defence. Subsequently, the crash was attributed to either the Mosquito's slip stream forcing the fighter out of control or the effect of the bomb blasts over the Gestapo HQ.

The three remaining Mosquitos returned safely to England, the total 1,100 mile journey having taken 4¾ hours; and the following day the 6 a.m. news carried details of the raid and told the British Public that they had a new light bomber. At 22 years of age deHavilland had given the Germans a birthday present it would be hard to live down, and the British, one which they would never forget: The Mosquito.

Revell's new 1/32 scale model of the Mosquito IVb Series 2 "GBE" is a faithful reproduction of an aircraft attached to the famous 105 Squadron that carried out the above raid. With a wingspan of over 20 inches and details such as removable cowling displaying a Rolls Royce Merlin engine, detailed cockpit interior and movable wheels and propellers, it cannot fail to take pride of place in any model collection.

Revell also make the Focke Wulfe 190D in 1/32 and 1/72 scale – and these are just two of over 200 kits in Revell's action packed range, many of which are famous World War II aircraft.

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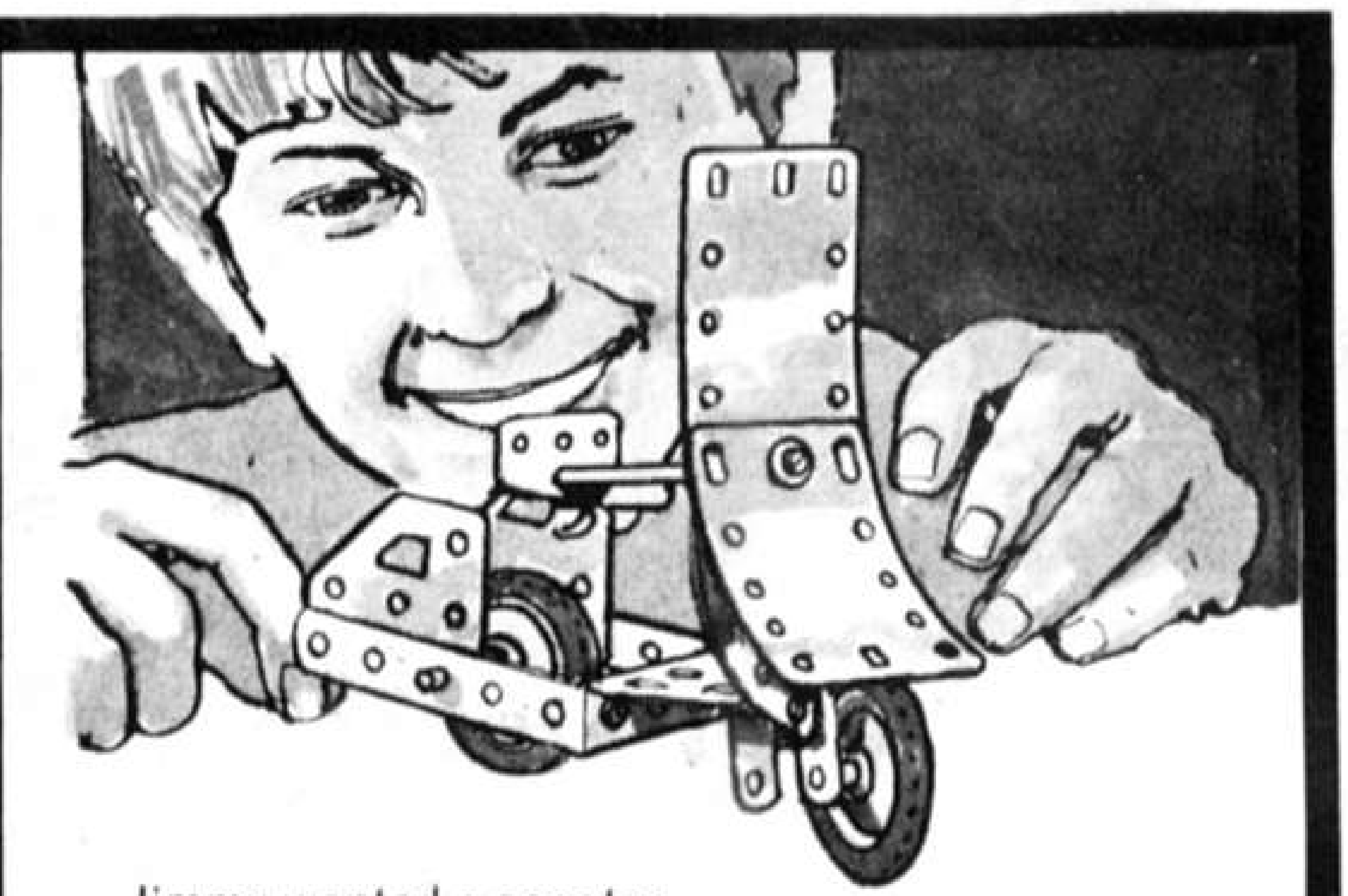
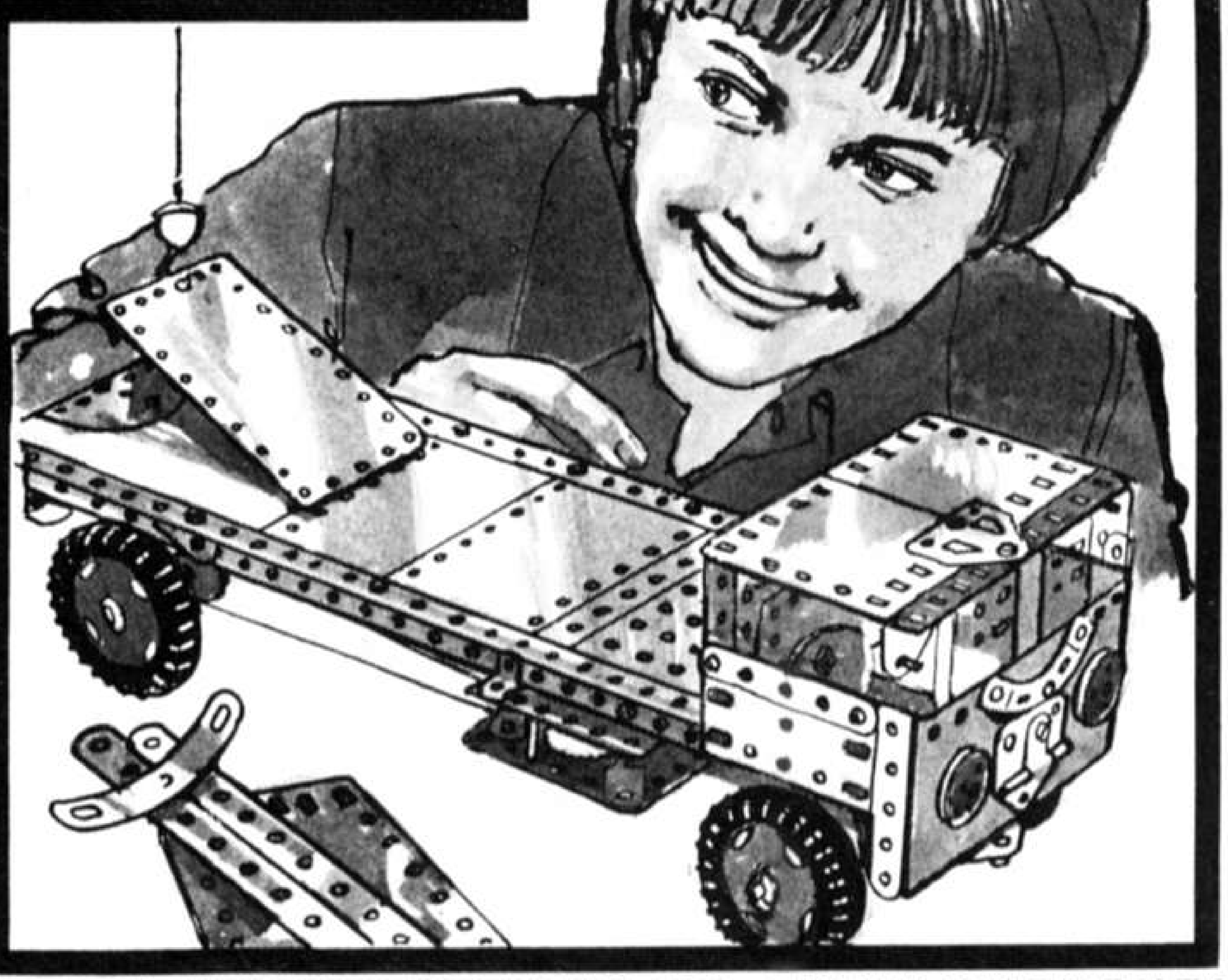
Lift it up and take it away! Tim's busy loading and unloading an important cargo with the crane he's made from his Meccano No. 2 Set. This week he's a crane driver, next week he's going to be driving a bulldozer on a building site!



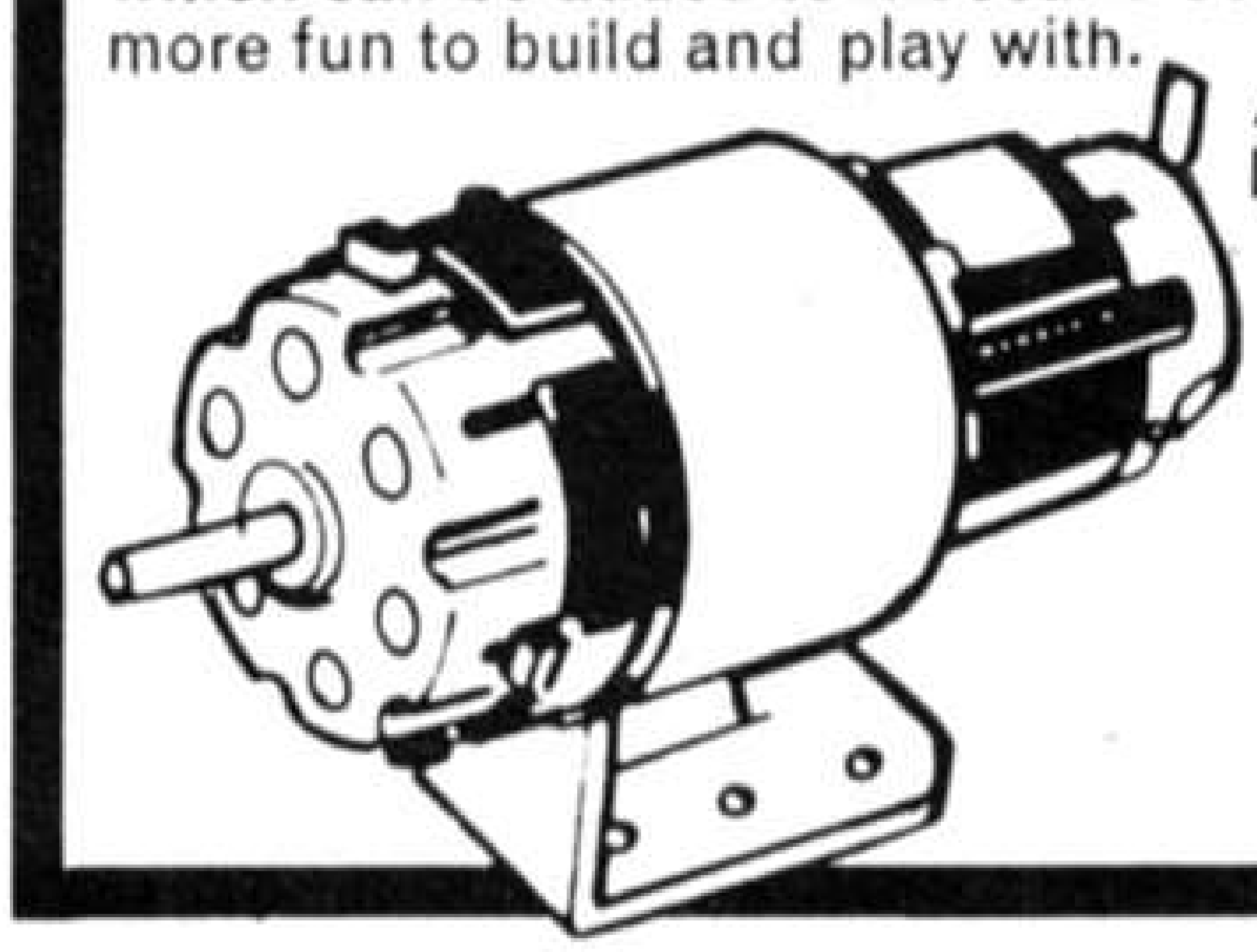
Jimmy wanted a scooter like his older brother's — so he built a model of it with his Meccano No. 1 Set. He had great fun making it — and now he's having great fun playing with it.

All the fun of the fair! Bill is having the time of his life with these two jet planes he's made from his Meccano No. 4 Set. Dad's enjoying himself too — he couldn't resist getting in on the act!

Come on, Tim — hurry up with that load! John can't wait to get on the road with this heavy goods lorry he's made with his Meccano No. 5 Set. The lorry is powered by a Meccano No. 1 clockwork motor, which John bought as an extra.



Motors . . . moving caterpillar tracks . . . a super tool set . . . gears . . . mechanisms . . . there's a whole range of extras which can be added to Meccano sets to make models even more fun to build and play with. Ask about them at your local toy shop.



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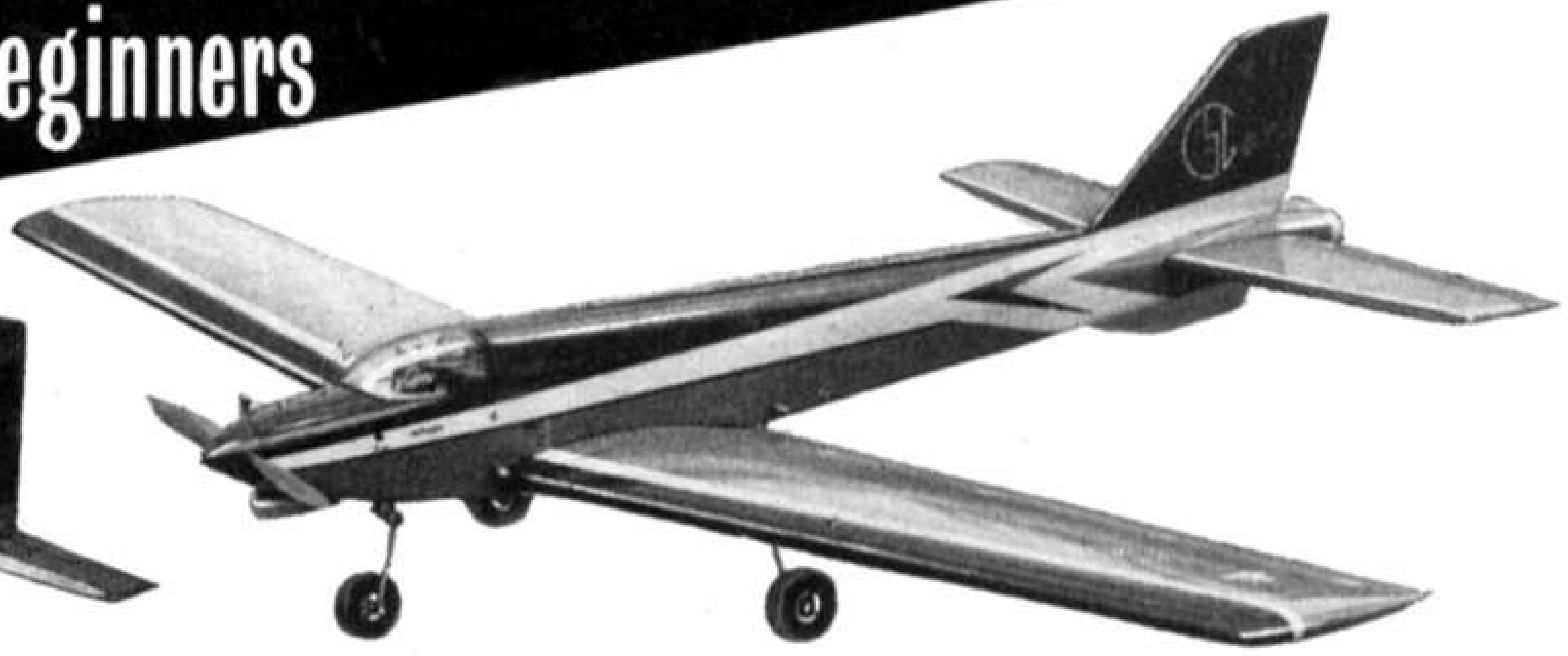

INTRUDER £18·72

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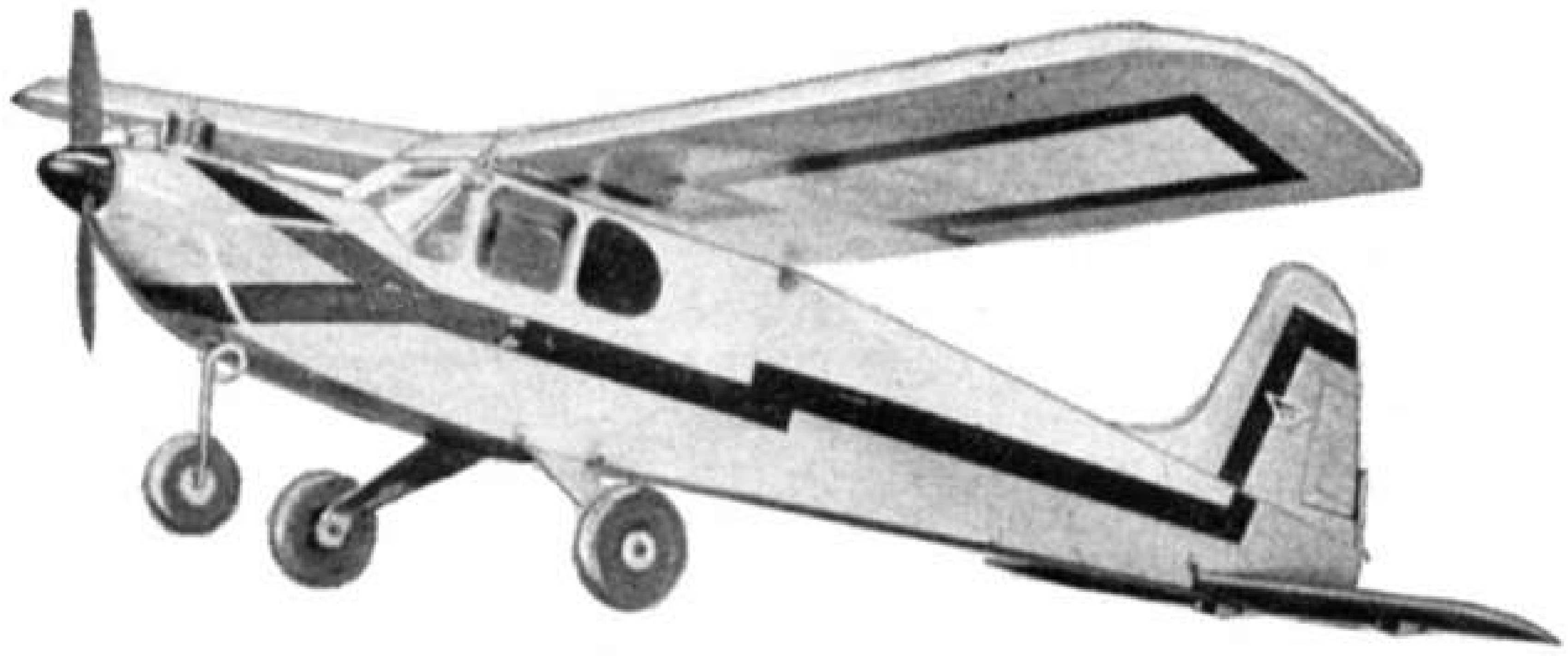
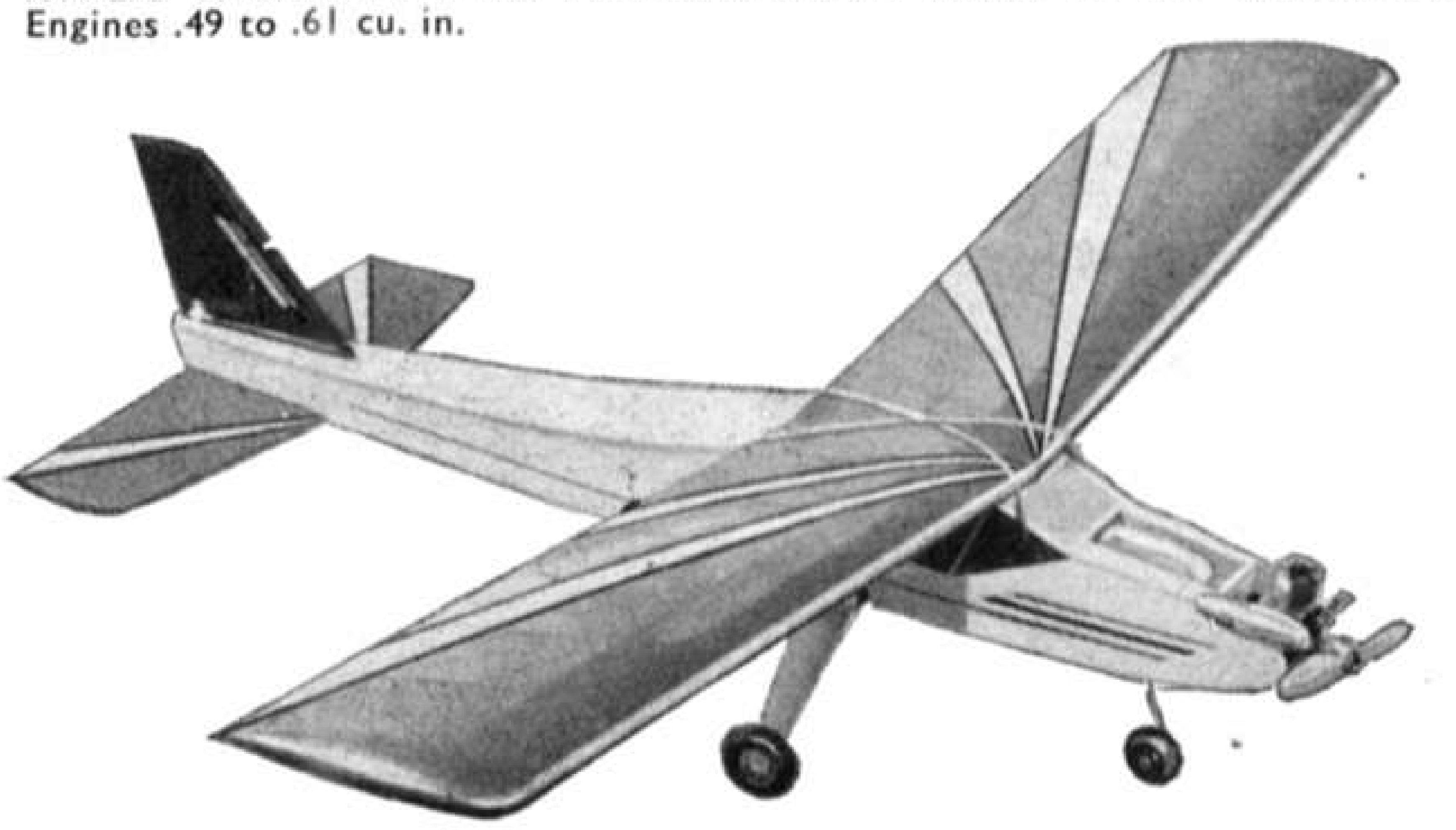


MINI SUPER £8·69

A real pleasure to built and fly. Kit contents include—all parts pre-cut, metal clunk tank, pre-formed undercarriage, three Low Bounce wheels, pre-shaped leading edge section, fullsize plan and building and flying instructions. Wingspan 48". For 1.5 to 2.5 c.c. engines. Single channel or intermediate R/C 48" span.



OUTLAW £5·79

A single channel sports model designed to take the newcomer through the first difficult steps of getting a radio controlled model successfully into the air. Designed to recover from difficult situations, the "Outlaw" gets away with MURDER. Wingspan 45". Engines .09–15 cu. in.
Complete building and flying instructions. Die-cut fuselage sides. All wing ribs identically cut. Pre-formed dural main undercarriage. Pre-formed wire noseleg. Paxolin motor mount. Fuel tanks and wheels.

STUDENT £12·25

A multi trainer for 3 channel up to full house. The newcomer to multi channel radio control can learn on his own with this model. Extra channels may be added when desired. Engines up to .35 cu. in. Wingspan 56".
Complete Building and Flying Instructions. One-piece die-cut fuselage sides. Identical die-cut wing ribs. Low Bounce Airwheels. Hard sides. Identical U/C, fuel tanks, hinges, nylon horns, etc. Ample selected building materials.

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Radio Control of Free Flight model for motors of 2.5–5 c.c. capacity. All shaped parts are pre-cut. The kit features a pre-fabricated dural and wire undercarriage, a reinforced vulcanised fibre mount and a clunk fuel tank. Besides ample building and covering materials, the kit contains an informative instruction booklet and two full-page plans. 63" span.

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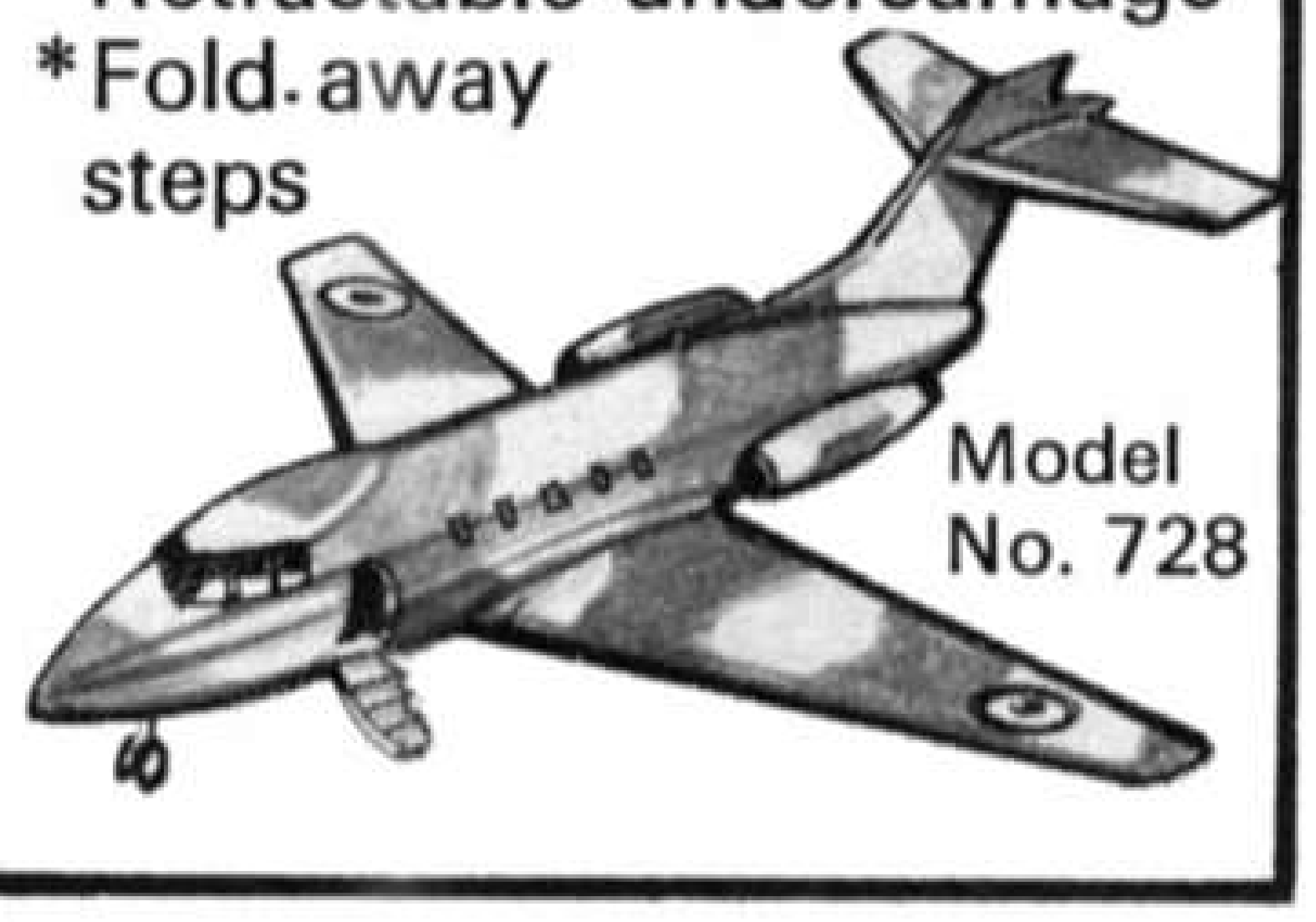

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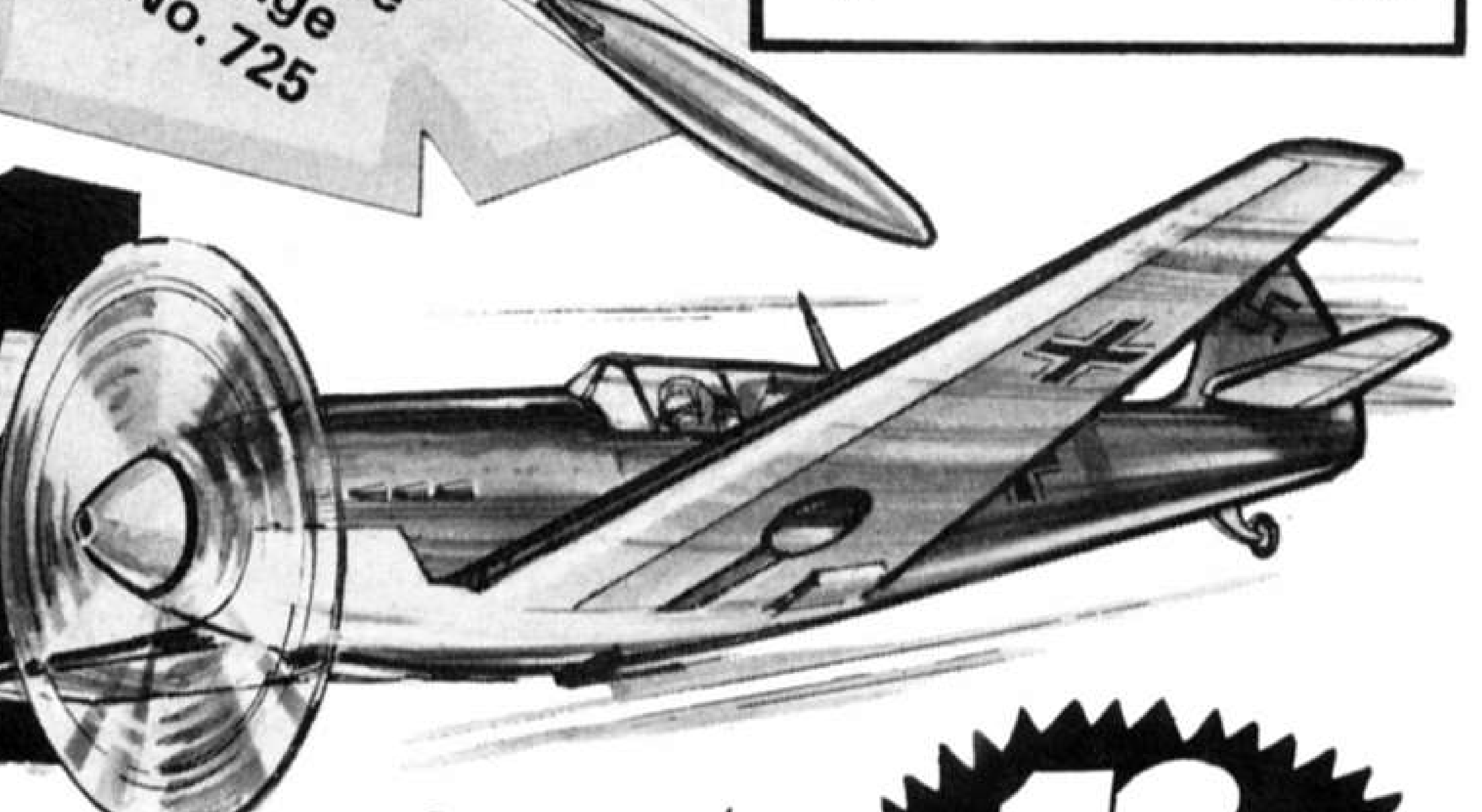


(Battery not included)

12 BIG PLANES IN THE DINKY RANGE

Dambuster Winners

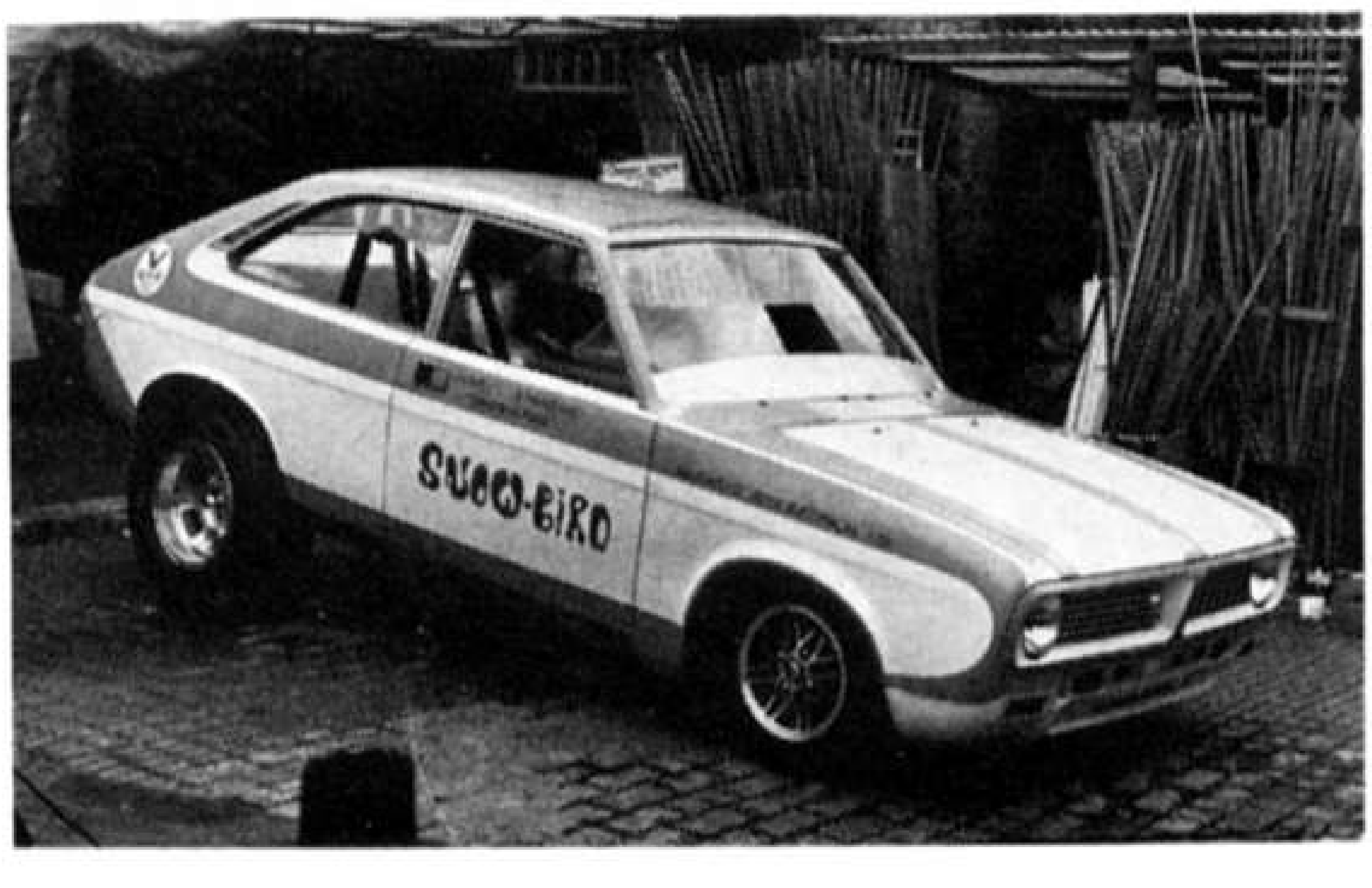
The top three prizewinners in the Revell "Dambuster" competition who flew by JetRanger and Islander to R.A.F. Valley (see this page last month) were Ian Brown, age 13, of Bognor Regis, Jeffrey Colding, 12, Combe Martin, and Michael Simpson, 10, Newcastle on Tyne. The picture below shows them trying a Gnat cockpit for size; the Polaroid cameras (and £50 each) were all part of their prize.

Varroo-oom!

Who ever thought a Morris Marina would be capable of 160 m.p.h. in 9 seconds from a standing start? That's what Whitelake Racing expect from *Snow-Bird* (see picture) which is based on a Marina Coupe body, mounted on a tubular frame chassis and powered by a 700-plus b.h.p. supercharged 5-litre V8 engine. The tail-up attitude is not surprising with 39 in. diameter slicks on the back end! The car is, of course, intended for drag racing and should have reached the anticipated 160 m.p.h. by the end of the standard ¼ mile drag strip.

Heinkel Colours

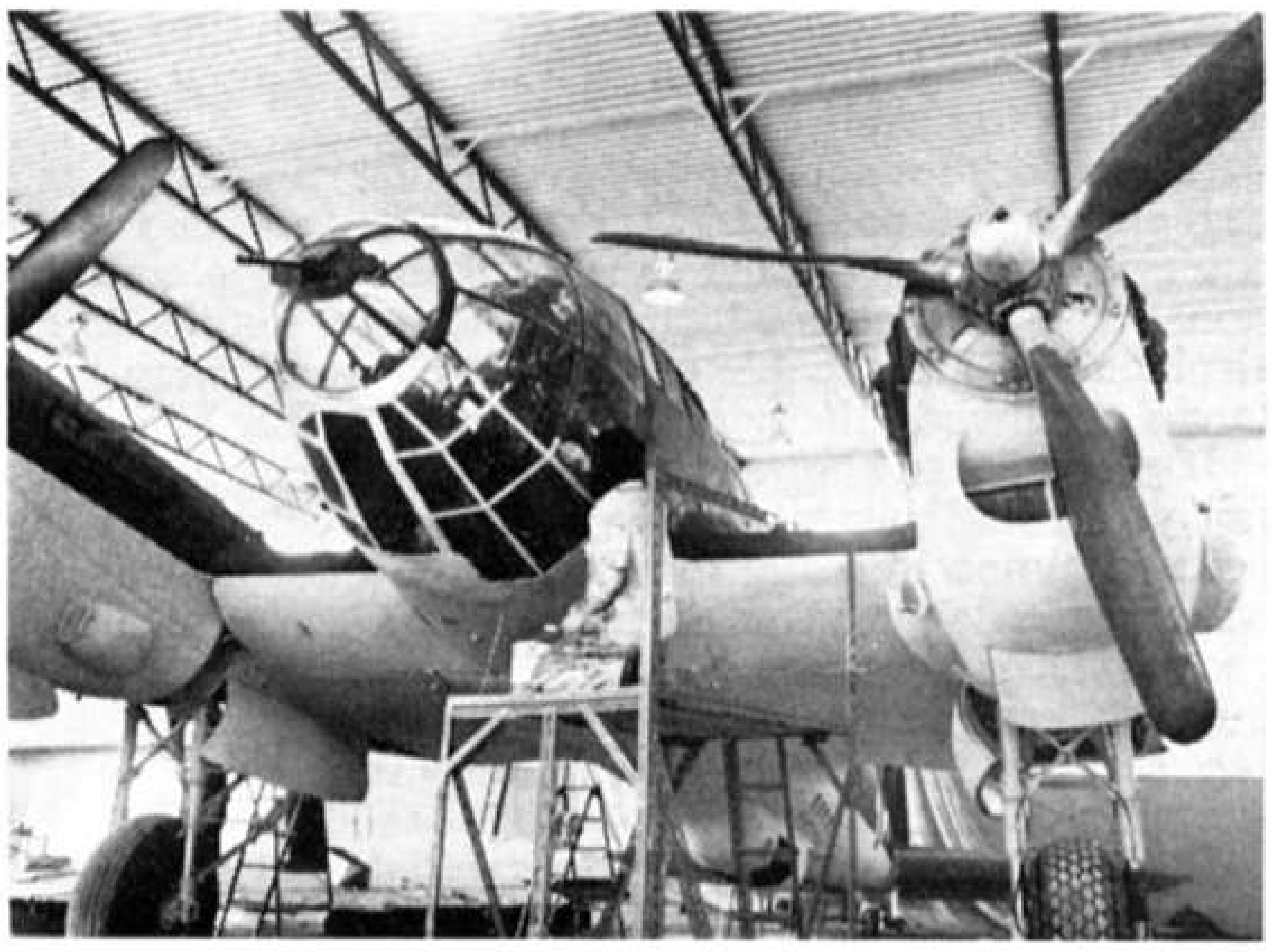
The Heinkel III in the right-hand photograph is one of a collection of historic planes from 1929 onward at the Historic Air Museum at Southend Airport. Humbrol Ltd. recently supplied nine gallons of their "Authentic Colour" enamel for restoration of this WWII bomber in correct Luftwaffe colours. This must have been a great help to the museum's restoration staff, and it is also a tribute to the authenticity of the vast range of colours produced by Humbrol.



ON THE EDITOR'S DESK

Steam Rally

One of the most fascinating of the steam rallies which take place during the year is that at Marsh Gibbon, near Bicester (two miles off the A41 between Bicester and Aylesbury). The accent is on vintage and veteran—tractors, cars, commercial vehicles, horse-drawn vehicles, and a fair, fair organs, plus hot air balloons, Morrismen, the Bicester and Warden Hill Hunt etc. Farming demonstrations by traction engines and horses, a farming museum, costumes, rides round the 300 acre site by vintage charabancs—the accent is on work and working exhibits. It's on Sept. 2 and 3, from 11 a.m., adults 30p, children 15p, free car park. There is a model tent, R/C and C/L flying, ox roast, sheep dog trials, vintage aircraft aerobatics—phew! Sounds like a great day out!



Smell Pollution

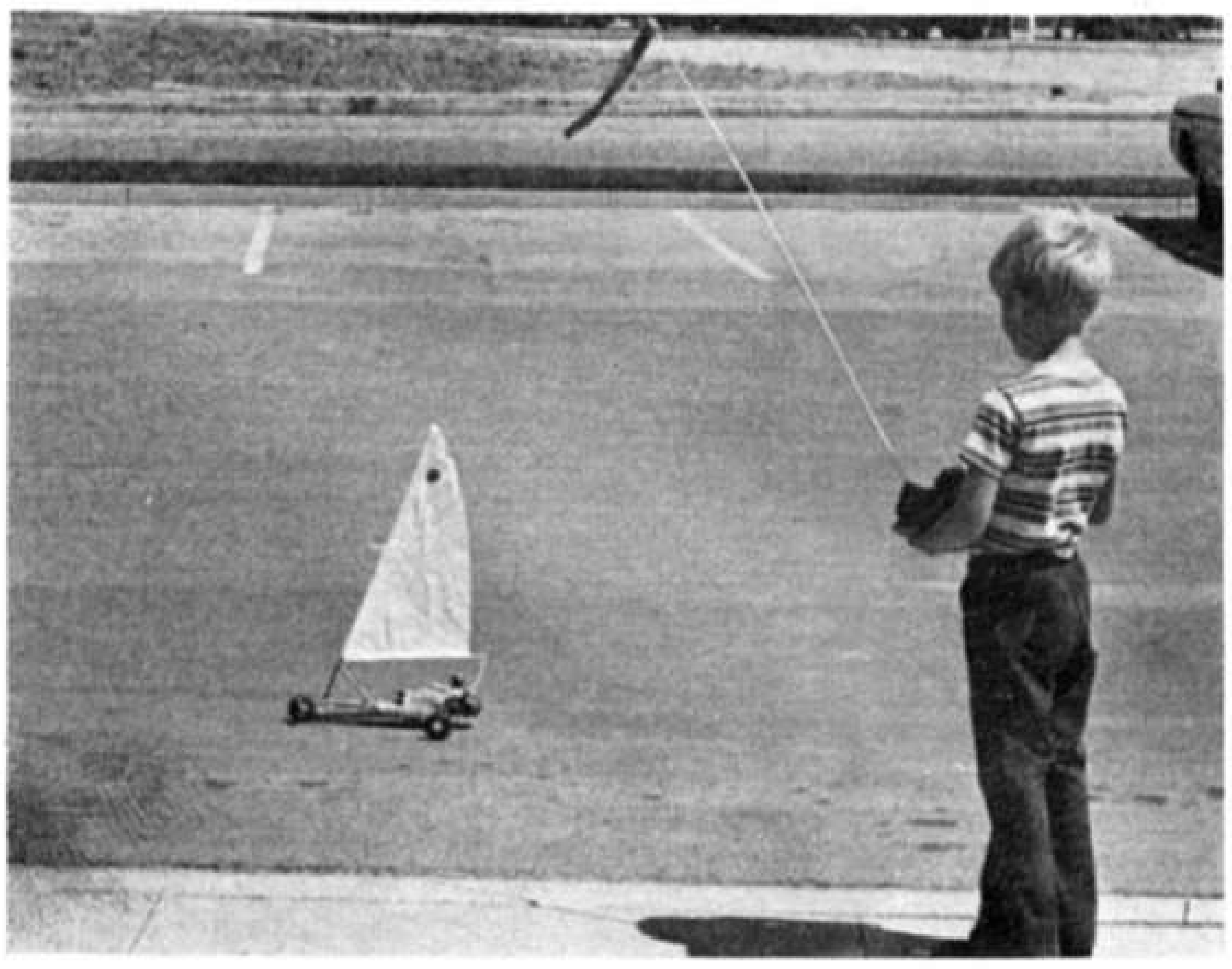
An intriguing little gadget has just been put on the market which, when switched on, releases controlled amounts of ozone, produced by electric discharge. This unstable gas reacts with the minute solid particles suspended in the air which are the source of smells, breaks them down, and in so doing reverts itself to pure oxygen. The machine is switched off in a matter of minutes, when the smell has been eliminated. Note eliminated—not replaced with another smell. The device, measuring only 7 × 4½ × 3 in., uses negligible current and is entirely portable, needing only to be plugged into a normal socket. It is called the Airbracer and costs £8.98 at major electrical retailers. Another scientific but simple weapon in the fight for a pleasanter environment.

Photo top left shows the three lucky youngsters who enjoyed flying from Luton to Anglesey to spend several hours on an R.A.F. station, including "flying" a Gnat simulator. Left, Whitelake Racing's drag Marina with over 700 horses under the bonnet. Above, restored Heinkel III at Southend Airport; note the asymmetric transparent nose.

Radio-Controlled Land Yachts

Will this type of modelling catch on? If you have a radio, it's not at all expensive to try it.

By George G. Siposs



MAN is lazy. Ever since the invention of the wheel he has been looking for a way to power the wheel so that, without any muscular exertion, he can move from one place to another. It was only a matter of time before sailboats inspired the innovators to put a sail on a land vehicle and a new form of transportation, and sport, was born. Maurice of Nassau, Prince of Orange, and his friends jaunted along the Dutch Coast as early as 1600 A.D. Their vehicles were clumsy four-wheeled wagons with square rigged sails designed by the Dutch mathematician Simon Stevin. Nevertheless, they could carry up to 30 people at up to 25 miles per hour, albeit only when the wind blew abaft the beam.

A few decades ago wealthy sportsmen in Europe had well engineered boats built for themselves and had them equipped with cat-rigged sails. These are the conventional triangular sails which act much like airfoils on an airplane and are capable of developing great propulsive forces even when the wind hits them from the side.

If you were to analyse the forces developed by such a sail you could prove to yourself that the boat can be pointed almost directly into the wind and still the sail will push it along. Due to the angle of the sail, the force vectors have a resultant which is far larger than the original force vector of the wind. Thus, a sand sailer can actually run up to three times the speed of the prevailing wind.

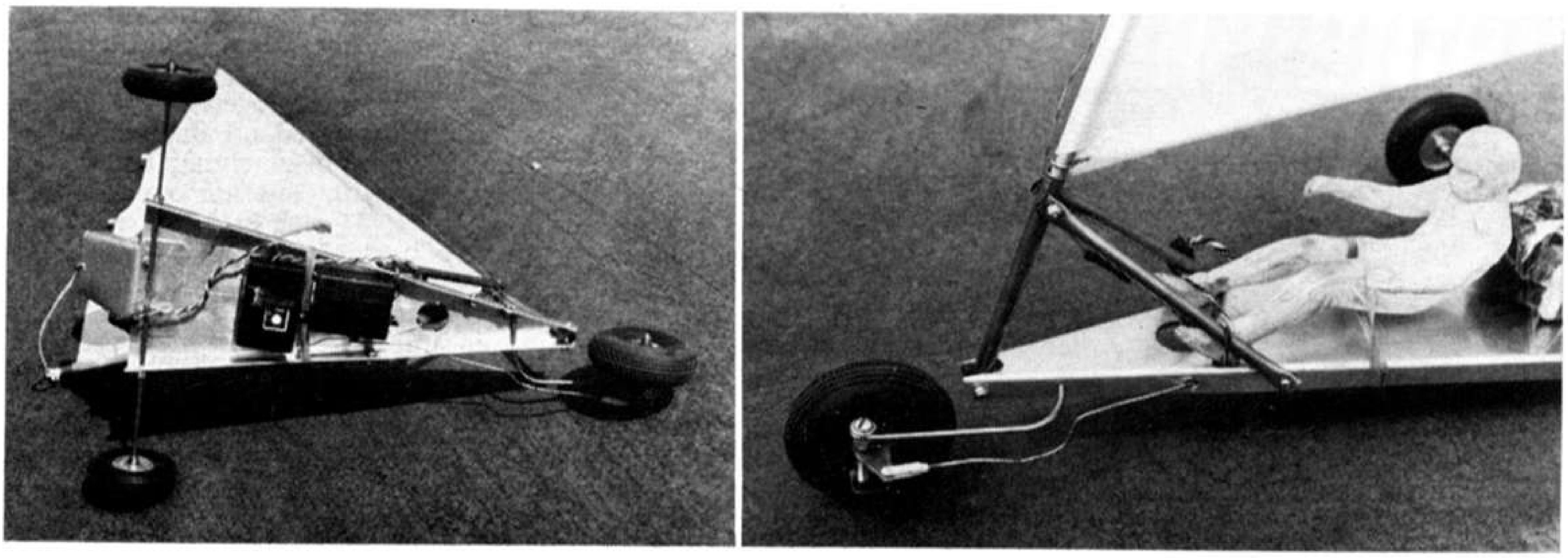
While in Europe, sand sailing is mainly for the rich, in America there are kits and assembled sailers available which cost less than most motorcycles. The number of enthusiasts is quite large, especially in areas such as Southern California, where there are large flat land masses available. One such area is the Mojave Desert, near Los Angeles, where clubs conduct rallies, slalom races and speed events on every weekend.

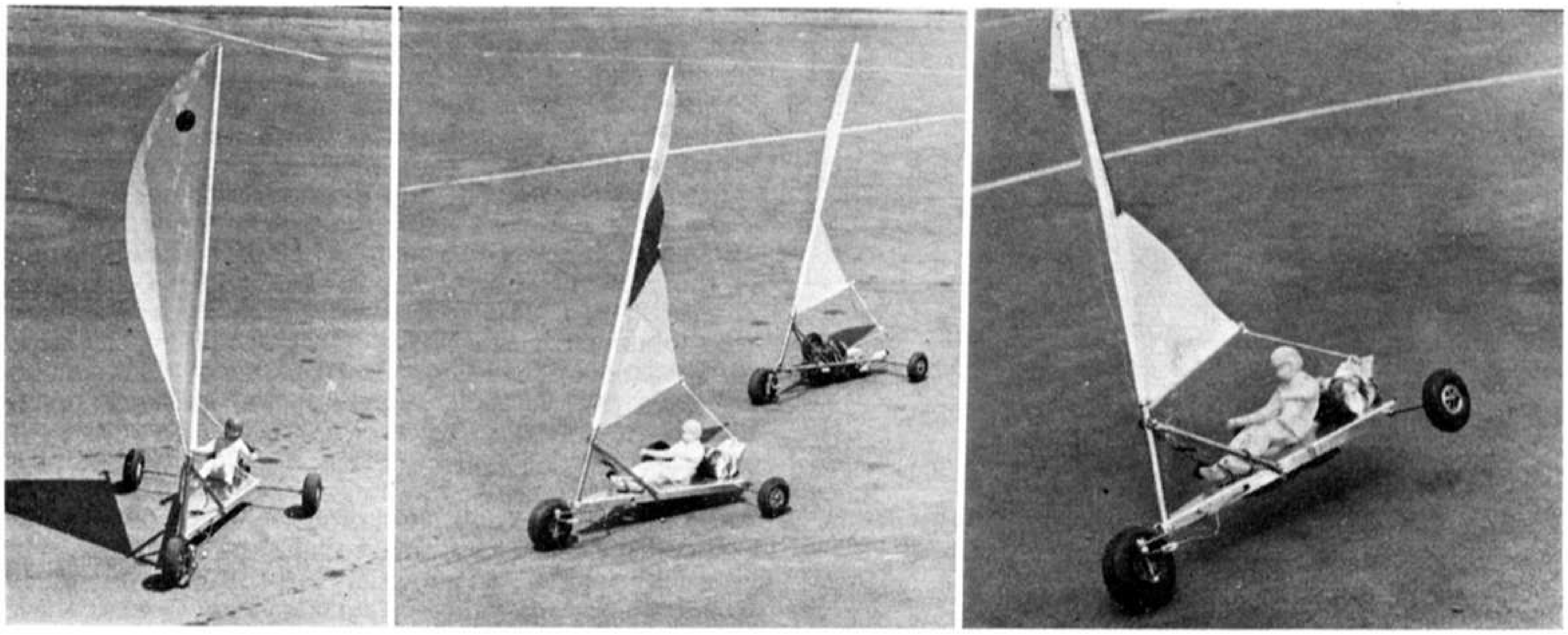
The basic simplicity of the sand sailer and the tremendous fun that the participants seemed to be having prompted me to develop model sand sailers and the results have been most gratifying. Most models are built to a scale of 1½ inch to a foot i.e. 1 : 8. From the ground up to the tip of the mast is about 27 inches high. The wheels are basically model airplane wheels having a diameter of 2½ inches. The chassis is made from brass tubes or metal and the axles are $\frac{1}{16}$ in. diameter piano wire. One can even put a "driver" figure in the cockpit to achieve perfect realism.

With proper trim and having a good breeze, the sailer will sail by itself in circles of about 35 feet diameter or more. As the sailer "comes about" the sail whips smartly to the opposite side all by itself. At certain times one of the wheels lifts off the ground and the sailer will run under a precarious, but very exciting, balance. The model can also be set to run straight but you have to be prepared to run great distances after it. It is imperative to have a smooth surface to run the sand sailer because a rough surface greatly reduces its speed and may even cause it to keel over instead of speeding forward.

A simple one-channel radio control system (such as the MacGregor) can be used for remote control. It is

Below left, an underside view showing the installation of simple radio; the battery is carried above the chassis. Right, basic mast support and steering arrangement.





Opposite page, an eight-year-old has fun with one of these simple-to-operate models. Above pictures show two different prototypes in action. Once built, running costs are negligible—all you need is a spot of breeze!

best to mount the components under the chassis to lower the centre of gravity. The digital proportional servo controls the steering action of the front wheel and one can expect to sail back and forth, performing all the basic sailing manoeuvres, as long as a breeze exists.

I can highly recommend this hobby to anyone who is tired of noisy and oily model cars or to anyone who wants a nice relaxing hobby without having to rebuild the model or tune it constantly. In other words model land sailing is the hobby you may have been waiting for. Several models can be raced simultaneously and the grace, the speed and the ease with which they negotiate turns never ceases to amaze you.

(Complete land sailer kits can be obtained from Universal Developments, P.O. Box 5253, Orange, California, 92667. Their price in the U.S. is $19.95 plus postage. Metal chassis, wheels, axles, Dacron sail, wooden mast etc. are included.)

The World's Most Beloved Teddy Bear

By

Australian contributor

Frank Madigan

OF ALL the animals in the world, the most appealing to children and young people is the so-called "Teddy Bear" of Australia. This quaint, cuddlesome, furry creature is really not a bear at all—he is a koala—a member of the marsupial tribe.

The koala has a chubby face, smug little mouth and keen, bright eyes, while his small, leathery nose completes his toy-like appearance.

The fur for which he was massacred in the thousands, until they were made "protected" animals in 1928, is grey or brown.

At four years of age, the koala is fully grown, and measures about three feet in height, although there is some variation in size. Yet such a small creature has an appendix measuring 9 feet in length!

He lives for about twenty years, and whilst the average weight of an adult male is eighteen pounds, that of the female is generally about thirteen pounds.

Like the opossum and the kangaroo, the koala is a marsupial, having a pouch which the cubs enter at birth, and in which they are nourished for the first six months. New-born koalas are tiny, shrivelled objects hardly an inch long, and not until they have grown their own fur do they emerge from the pouch. Even then they are rather helpless, being still only about the size of a rat, and they cling about their mother's neck, snuggling into her thick fur. When the baby first leaves the pouch, it takes the opportunity of making the acquaintance of its mother, by crawling over her fur, examining her face

ears, nose and eyes. Fully formed, it is still very helpless even when a year old.

Mother koalas are excellent nurses, often nursing their babies in their arms like human mothers. When on the move, the cub rides effortlessly on his mother pick-a-back fashion.

Strangely enough, the koala does not drink, and his name is one of many which the aboriginals gave to this delightful creature. To them it means "does not drink water" and all the liquid he requires is derived from the leaves of the eucalyptus. The aboriginals of a different tribe called him "Lallewoon" which means "sweet".

The aboriginals have many legends about all animals indigenous to Australia, and of the several about koalas, perhaps the one told to explain why the bears do not drink, is the most attractive. According to their legend, the koala race and the aboriginal tribes had a quarrel. The koalas accused the aboriginals of cruelty, and the natives retorted that the koalas drank up all their streams and robbed them of their water supply. The dispute was settled when it was agreed that the blackfellows should leave the creatures alone, and that the koalas would, in their turn, promise not to drink up the water. From then on, they did not drink water.

To the first British settlers in Australia, the koala was a source of great wonderment. The first official account of these creatures appeared in the Sydney Gazette on August 21st, 1803. It was written by a Mr. Barallier, who obtained a koala for Governor King to send to England. Nowadays the Australian Government zealously guards these creatures, and their export is forbidden.

Koalas are also protected from animal lovers keeping them as pets, because they must have about two and a half pounds of the right kind of leaves every day. They are delicate and succumb to all kinds of ailments, especially chills, pneumonia, eye-sores, and kidney troubles. It was proved that for many years, those animals which were kept in captivity as pets, in private homes or zoos, died quickly.

Before the white man arrived in Australia, koalas crawled around our eucalyptus forests in millions. Unfortunately, because their fur is waterproof and therefore valuable, the early settlers went after their pelts. Even as late as 1920–21 no less than 205,679 koalas were killed. When they had almost been exterminated in New South Wales and had become only a memory in Victoria, the hunters turned their attention to Queensland. There, in 1927, the appalling total of 584,738 adult koalas were killed in one month, and 200,000 cubs died with their mothers.

However, the future looks brighter for the koalas of Australia these days, as since 1928 many sanctuaries have been set up to give them complete protection, and they are said to be thriving. One of the largest is at Kangaroo Island, South Australia, while Phillip Island, Victoria, is another paradise for them. People are permitted to drive through their sanctuary, and may view these sleepy creatures curled in the forks of gum trees beside the roadway. There is a notice asking motorists to take care, because koalas sometimes cross the road there. Koala Park in New South Wales and another settlement in the protected eucalyptus forests of Eastern Queensland also care for these interesting marsupials. There are other places as well, where special manna gums are being planted to provide the necessary food for them.

Australia is indeed proud of her koalas, and is now doing everything possible to preserve these creatures as an essential part of her fauna heritage.

BLUE RIBAND *(from opposite page)*

In 1938 the *Queen Mary* covered the allotted distance in 85 minutes less than the ill-fated French liner. It thus became the turn of the Cunard Line, as the owners of the *Queen Mary*, to hold the trophy. The French promptly returned it to the jeweller's shop in Market Square, Hanley, but the *Queen Mary's* owners never claimed it. The Cunard officials argued that "record-breaking" was "incidental" to the trips made by their liners.

Thus it was that throughout the war years the lovely four-foot silver trophy lay unclaimed. Indeed the record breaking didn't begin again for some years after the war ended. In July 1952 the liner *United States* set out on her maiden voyage. She crossed the Atlantic in three days, ten hours and forty minutes. With this time the trophy was hers. To-day the record is still held by the *United States* which is now laid up at Norfolk, Virginia, and it is unlikely she will ever sail again under the flag of the United States Lines. It is also unlikely that any vessel will ever be built now to challenge the speeds of the *United States* on her maiden voyage in 1952.

Under the rules, the £3,000 Trophy is to be retained by the holder of the speed record until its speed is surpassed. But, says another proviso, the speed record holding vessel being sold, scrapped or otherwise disposed of will mean that her owners have to yield up the Trophy, and here is the dilemma. There are no Trustees alive to-day to whom the Trophy can be returned by the United States Lines as their record winning vessel lies at Norfolk, Virginia. One suggestion for the Trophy's future is that it will end up in the British National Maritime Museum at Greenwich.

What Future for the Atlantic Blue Riband Trophy?

By Sam Napier

THE halcyon days of the well-filled giant passenger liners streaking across the Atlantic on record-breaking voyages are over. The Hales Trophy, awarded for the fastest trans-Atlantic journey between Ambrose Light and Bishop's Rock, is in the offices of the United States Lines in New York, and since all the trustees appointed by the Trophy's donor are now deceased, the future of the silver trophy is in doubt.

Will it remain in New York, as the American liner *United States* was the last vessel to win it? Or will its last resting place become the British National Maritime Museum, Greenwich because its donor was a former British M.P.?

In the pre-war days speeds across the Atlantic were news. Then, as now, speed was important. But aircraft can make the journey much faster. Yet comfort, as well as speed, is what the shipping companies offer.

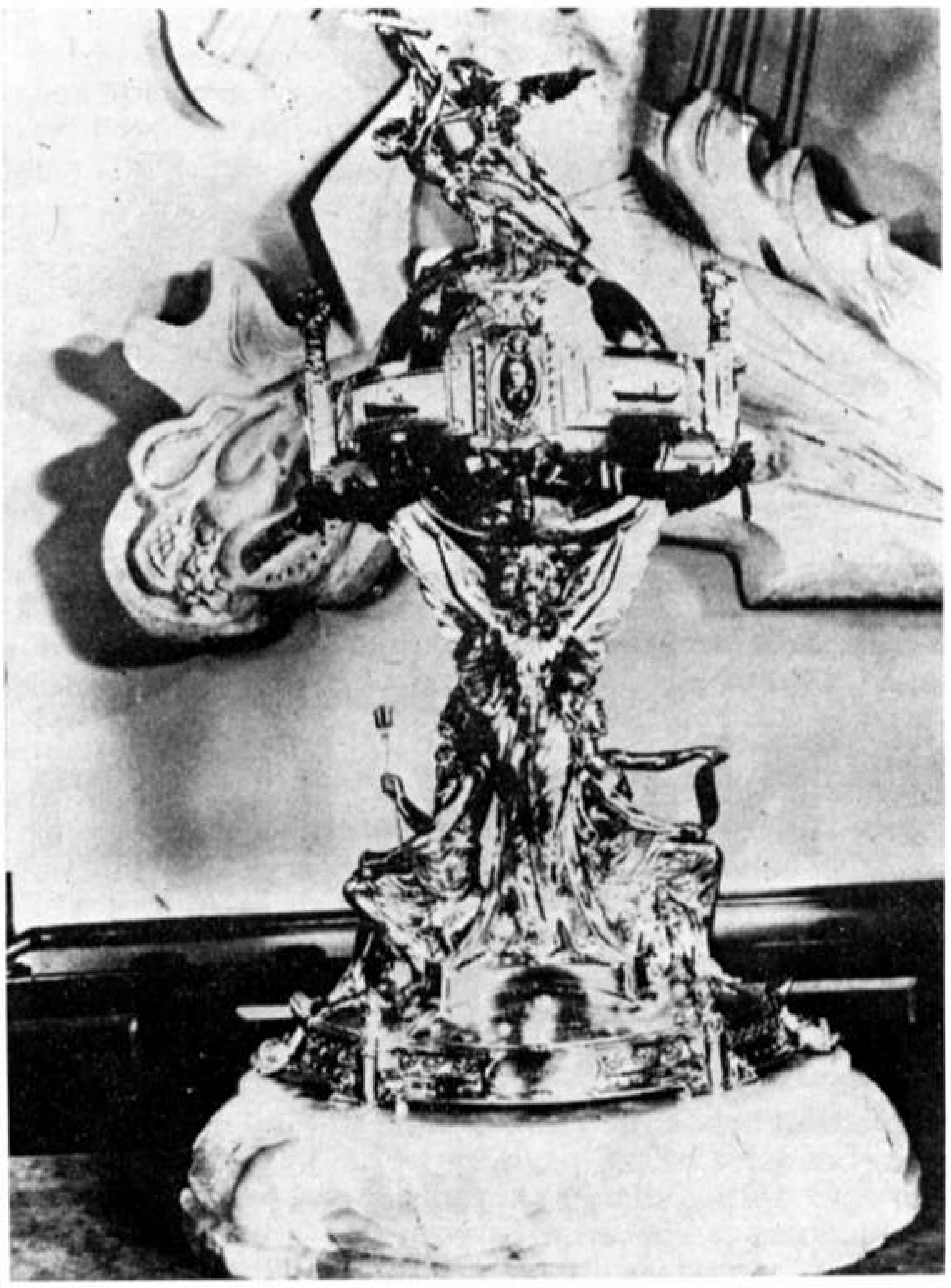
The most important Atlantic passenger route is that between New York and Southampton, and there have been keenly fought battles between rival shipping companies of many nationalities for the honour of this record. Up to July 1952 the *Queen Mary* held it, but in that month the crack American liner *United States* clipped ten hours off the British vessel's time. Before the *United States* on her maiden voyage won the coveted prize, France, Germany and Italy as well as Britian held it.

For hundreds of years men have been pitting their skills against each other and the elements in racing across the Atlantic. One clipper, using only wind power, travelled at more than 300 miles a day across. But the era of modern challenges dates only from the end of World War One. Then, the *Mauretania* which had won the record in 1910, retained it for more than twenty years.

In the 1930's questions of national prestige at sea arose and the pace of competition quickened. Germany set out to recover the speed record. With her challenger, on its maiden voyage from Cherbourg to New York, she succeeded in cutting down the time taken to four days, seventeen hours and forty-two minutes. A short time afterwards it became clear that both France and Italy had their eyes on the "Atlantic Blue Riband". By Mussolini's orders the giant liner *Rex* was built to win the title for Italy. On her maiden voyage she suffered some damage to machinery and the attempt failed. At the second try she became the ship to make the fastest Atlantic crossing. Then the French took up the challenge, and soon they had captured the record with their huge luxury liner *Normandie*.

That was in May 1935. For three years after the *Normandie's* crossing between Ambrose Light and Bishop's Rock in four days, three hours and five minutes, there were no other claimants for the record.

It was a few months before the French liner's exploit that the Trophy was donated. It was the idea of Mr. Harold K. Hales, M.P. for Hanley. He offered the beautiful silver prize, weighing between 400 and 500 ounces, for competition. This magnificent award was to be held in perpetuity. It went first to the owners of the *Rex*, followed by the owners of the *Normandie* when the French vessel wrested the title.



Mr. Hales, when he decided to give the trophy, had an international committee set up to make the award. This body drew up the rules and made the regulations under which the prize was to be awarded and held. Known as the "Atlantic Committee", it was to consider all claims to the prize.

(continued opposite)

MAIDEN VOYAGE
QUADRUPLE SCREW TURBINE STEAMER
UNITED STATES
Commodore Harry Manning
Captain, U. S. N. R.

Abstract of Log **Voyage 1, Eastbound**

From NEW YORK to SOUTHAMPTON, via LE HAVRE

DATE	LAT. N.	LONG. W.	NAUT. MILES	SPEED	WIND	REMARKS
July 3						Departure **Ambrose L. V.**, 2:36 p.m., EDT
" 4	41-12	58-43	696	34.11	SW-4	Slight Sea
" 5	45-03	41-42	801	35.60	SW-4	Moderate Sea
" 6	49-04	22-41	814	36.17	Var-5	Moderate Sea
" 7	49-49	01-14	833	36.21	Var-5	**Bishop Rock abeam** 6:16 a.m., BST
" 7			47		Var-5	Arrived **Havre L. V.**, 1:24 p.m., BST

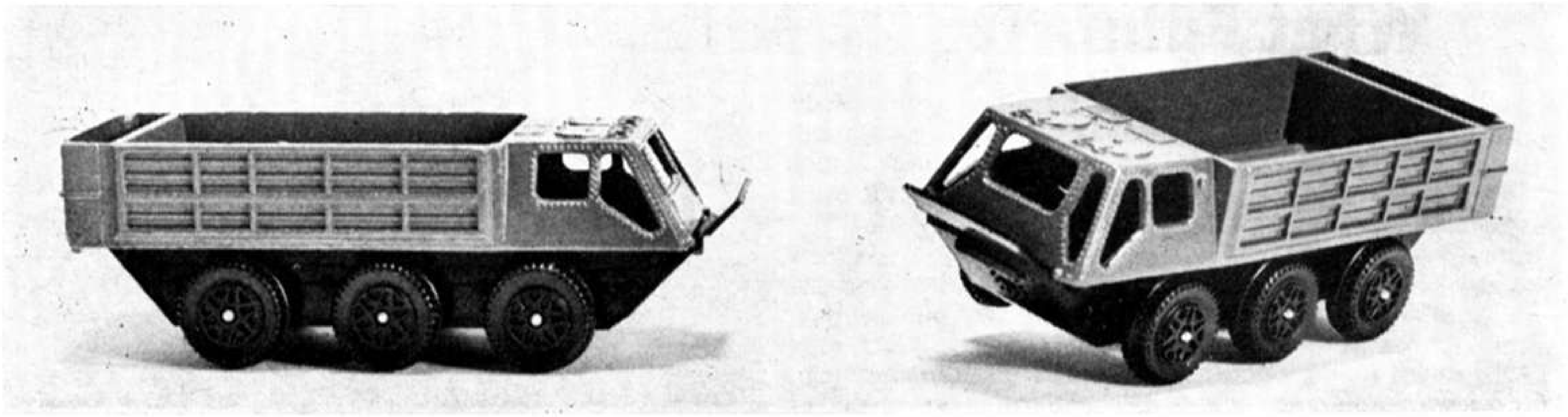
Passage **Ambrose L. V. to Bishop Rock: 2,949 Miles**
3 Days, **10 Hours, 40 Minutes** — **Average Speed: 35.59 Knots**

Total Distance, **NEW YORK to LE HAVRE: 3,191 Miles**
Steaming Time: 3 Days, **17 Hours, 48 Minutes** — **Average Speed: 35.53 Knots**

NOTE: A Nautical Mile is approximately 15 per cent longer than a Statute or Land Mile

These passages are world records. It is the first time in a century that an American ship has captured the Blue Ribbon of the North Atlantic. The United States Lines is rightfully proud of the achievement. We believe you are too.

Left Havre L. V., 12:46 p.m., BST, July 8, 1952 Arrived Nab Tower, 3:37 p.m., BST, July 8, 1952
Distance, **Le Havre to Nab Tower: 75 miles**
Steaming Time: 2 Hours, 51 Minutes — **Average Speed: 26.31 Knots**



Dinky Toy No. 682 Stalwart Amphibious Load Carrier, is an excellent "traditional" Dinky sporting a wealth of fine detail. "Sturdy Stalwart"—what more apt name could be given to this robust die-cast Dinky Toy?

DINKY TOY NEWS

New Dinky Militaria

by Mike Peddie

ONE very large group of people who could not under any circumstances claim that they were being neglected are the military vehicle collectors. In the past three months Dinky have released a Ferret Scout Car, a Sea King Helicopter Kit, a Messerschmitt ME 109 and a D.U.K.W. Amphibian. Now, this month, the military range has been even further increased with three new releases, all of which should make first-class additions to any collection. There's something for everyone, whether you prefer your Dinkys to be traditional, action-packed, or in kit form. The traditional is catered for with a Stalwart Amphibious Load Carrier, the action-packed with a Phantom 2 aircraft and the kit with a Dinky Kit version of the existing Spitfire Mk. 2.

Sturdy Stalwart

Looking first at the Stalwart, this is based on a fully amphibious (travels on land and water) vehicle manufactured by Alvis Ltd., of Coventry. The original is primarily designed to carry a maximum load of 5 tons of medium-density stores over varying terrains and on water, and to facilitate the loading of these stores, it has drop-down sides and tailboard. Powered by a B.81 8-cylinder petrol engine which produces something like 220 b.h.p. at 4,000 revs., it is capable of an average maximum speed of 30 m.p.h. on the roads, and 20 m.p.h. cross-country. As an amphibian, built-in propulsion units give a speed in still water of 4½ knots, and it can drive straight from land to water as no special preparation is required for water-borne operation.

Scaling things down slightly—from 21 feet 1 inch to just over 4 inches, to be exact—the Dinky Toy Stalwart is an excellent part die-cast, part tough polypropylene representation of the real thing. Riveting, panelling, hatches and ventilators are just a few of the many features represented on this fine model, and it also has "glazed" windows for added effect.

The body of the review sample before me is finished in semigloss military green, while the base is black. However, I understand that this and all appropriate Army models manufactured in the future are likely to be given a matt finish once stocks of semi-gloss paint have been used up. Being mounted on six correctly-positioned Speedwheels gives the model excellent push-along performance, and I feel that this model, which is marketed as Dinky Toy No. 682 Stalwart Amphibious Load Carrier, is excellent value and a "must" at a recommended U.K. retail price of only 29p.

High Flyer

Moving on, or rather up, Dinky's second new model this month is a Phantom 2 F-4K aircraft which, in my eyes, is one of the most beautiful Dinky Toys ever produced. Before describing it, however, I feel a few words about the real thing would be in order.

The Phantom, officially described as a two-seat, all-weather, multipurpose fighter, is actually an American aeroplane (manufactured by McDonnell Douglas, of Saint Louis, Missouri), which Britain has purchased for operational use by both the R.A.F. and the Royal Navy. The British version, though, unlike the American original, is powered by our own British engines in the form of two 12,250 lb dry and 20,515 lb reheat Rolls-Royce RB 168-25R Spey Mk. 202 Turbofans (try saying that lot in one breath!). These mighty power units give the aircraft a speed capability of 910 m.p.h. (Mach 1.2) at 1,000 ft. and 1,386 m.p.h. (Mach 2.1) at 40,000 ft.—which is fast to anybody's way of thinking!

Although not capable of such outstanding performance, the Dinky Toy Phantom, No. 725, will undoubtedly go places—probably more places than the real thing, in fact, as Dinkys are exported to more than one hundred different countries throughout the world. Built to 1/90 scale, the model measures $7\frac{9}{16}$ inches long and has a wing span of $5\frac{3}{16}$ inches, making it a relatively large Dinky. Casting outline detail is effective, and includes all the control surfaces (flaps, rudder etc.), the undercarriage housings, and the air intakes. I mentioned earlier, however, that the Phantom was an action-packed model and it is, the "action" coming partially from a retractable tricycle undercarriage, but particularly from a working "stand-off" missile. This is a light plastic "bomb" which slots into a spring-loaded launcher under the fuselage and which is fired by pressing a small button projecting from the right-hand side of the fuselage, above the starboard wing. Locked in position, it gives the model the appearance of a powerful attacker and the fact that it can be fired adds tremendous play-value to the whole affair.

Another interesting—almost beautiful—feature of the model is its finish. As I said, the real Phantom is in use by both the Air Force and the Navy and, by way of a change, the Dinky carries the striking colour-scheme of the navy—pale blue undersurfaces and deep blue top surfaces, set off by a black nose-cone and jet exhaust nozzles and a long transparent cockpit canopy housing two miniature airmen. It comes with British roundels already fitted, but complete with a sheet of additional waterslide identification transfers for self-mounting. Once these have been fitted, the model looks really magnificent; well worth its recommended U.K. retail price of £1.29.

Spitfire Kit

As the Spitfire Mk. 2 proved to be so popular as a "ready-made" Dinky, Meccano have now released this famous aircraft in kit form and I have no doubt that it will prove equally as popular.

Construction is relatively simple yet extremely enjoyable, and due to the fact that assembly involves the use of self-tapping screws instead of rivets, or adhesive, the model can be dismantled and re-assembled as many times as desired. The 21-piece kit includes a "flick-start" electric motor, a retractable undercarriage and all the other components necessary to complete a real die-cast metal Dinky Toy. A suitable camouflage finish is ensured by the inclusion of two sample phials of appropriate Humbrol enamel and a sheet of waterslide aircraft marking transfers.

Marketed under No. 1042, the Spitfire Kit retails in the U.K. at a recommended price of 79p.

Dinky Safari Rally

I am now delighted to pass on some news of one of the most interesting ideas I have ever come across in relation to Dinky Toys, namely an East African Dinky Safari Rally, organised by Mr. D. R. Austin, Head of Arts and Crafts at St. Andrews School, Turi, East Africa.

Mr. Austin was a Control Officer in last year's real-life East African Safari and his experience in this gave him the idea of running a miniature rally for his pupils. It took a good deal of organising, but he finally came up with a successful formula which included a 5-mile course over various types of terrain and a set of strict rules based as closely as possible on those for the real rally.

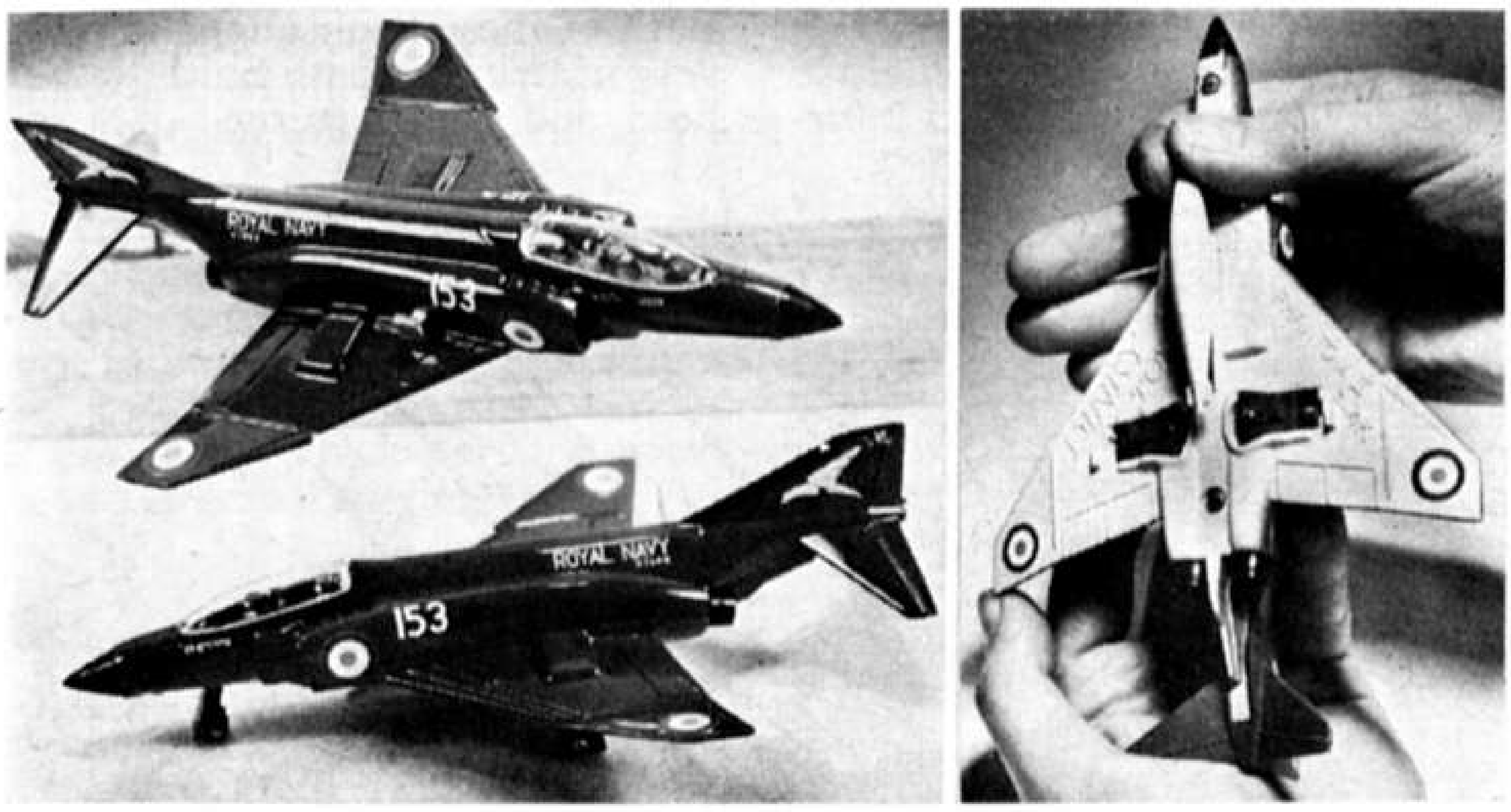
The children wishing to enter the rally had to supply a car and nominate a driver and co-driver. All the details were taken—names of drivers, make of car, class of car, etc. (class depending on make of car) and, after paying the 50 cents entry fee, they received the information sheet which, among many other things, gave details of the towing device to be used. The towing apparatus involved a length of wire which was used to make two rings which were attached to the front of the car, a length of cotton measuring not less than 12 inches, and a stick between 20 and 24 inches long. The entries closed after one week and a draw decided the identification numbers and starting order for the 72 entries.

The entrants were extremely busy on the days preceding the rally, preparing their cars for the gruelling five miles that lay ahead of them and, came the day, the cars resembled their "big brothers" right down to mud flaps and advertisements.

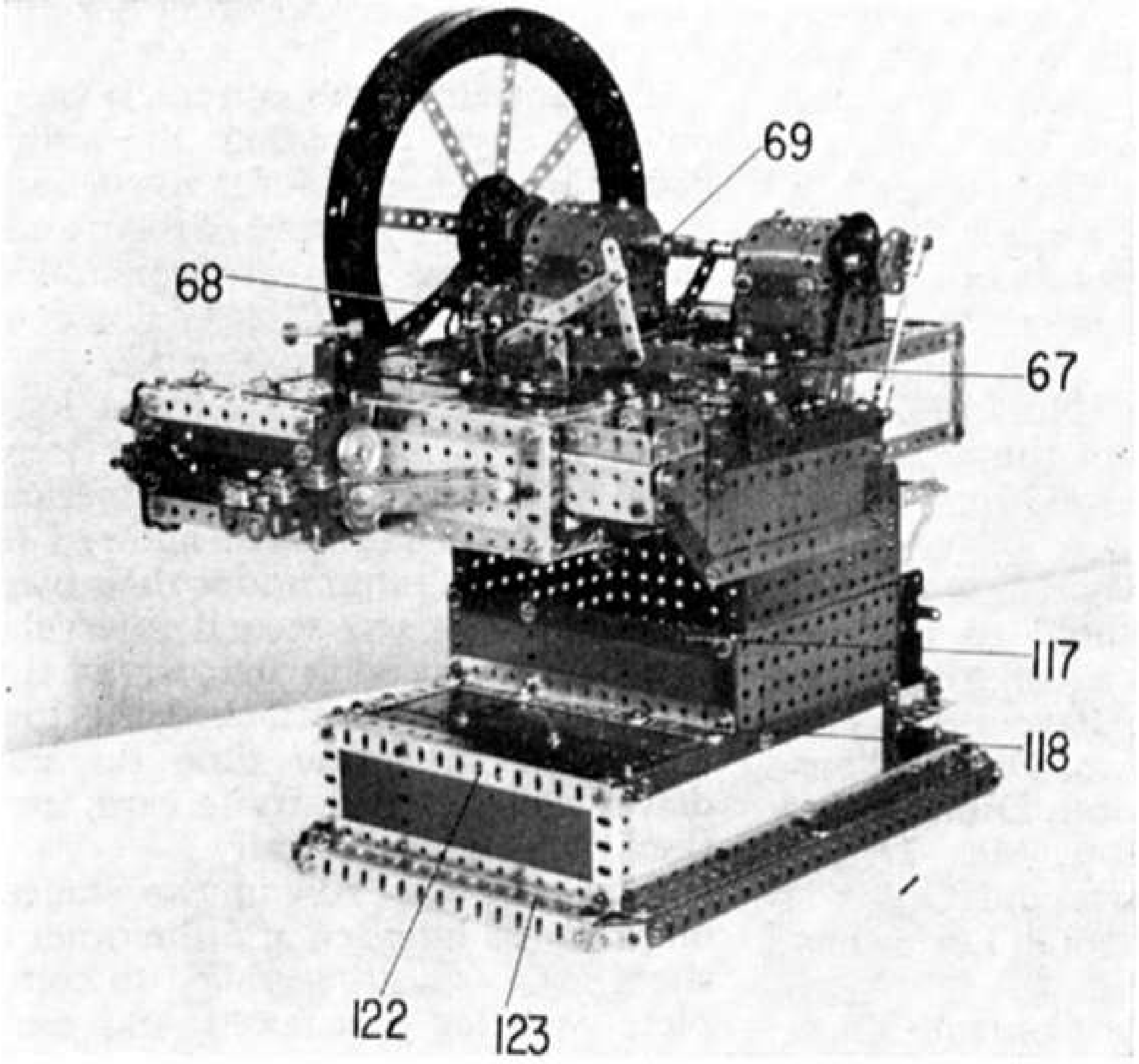
At the start of the rally, a long ramp was set up and the cars were lined up at the top in numerical order. They were then allowed to run down the ramp under their own momentum at ten second intervals, the driver receiving his car at the bottom, where he attached the tow rope. At the same time the co-driver collected the route card, and they then began the rally.

The rally was run in two stages, one being a long leg and the other a short leg. The time taken to complete each leg was noted, and each minute taken represented a point against them (e.g. 1st leg, 102 mins. 2nd leg, 48 mins: total points lost—150). Points were also awarded and taken off at the initial, intermediate, and final scrutineering. The minus points were then added to the points lost to give a grand total and overall position. Finally, after five back-breaking miles, prizes were awarded for the first car home, the overall winner and the winners of classes, and I am told that a thoroughly enjoyable day was had by one and all.

This is a truly original and interesting idea, and I would like to thank Mr. Austin sincerely for supplying the details of the rally. I can see no reason why rallies of this sort should not be staged in Britain, as there is great scope for inter-group and even inter-school competition. If anybody is interested, therefore, I would be only too pleased to give some further and more detailed information on Mr. Austin's successful endeavour, upon request.



These views of the newly released Dinky Toy F-4K Phantom 2 clearly portray the splendour of this fine model which is marketed under Sales No. 725. The underside view shows the retractable undercarriage, and the method of loading the "stand-off" missile.



A "Riveting Situation"

—leading up to a Meccano model of an automatic rivet-making machine

Part 1

By P. Blythe

DINKY Toy "Spitfire" wheels, bicycle mudguards, television sets and ladies' handbags may at first sight appear to have little in common. There is a linking factor, however, this being the need for enormous quantities of the products to be manufactured, economically. It is therefore absolutely essential that the components which make up the various products can be put together easily and cheaply and that they do not fall to pieces in use. This is where modern riveting scores over most other fastening systems.

The term "rivet" normally conjures up the vision of a large threadless bolt which is placed by hand into a pre-drilled hole and hammered over to secure the joint. While rivets of this type were used extensively by blacksmiths many years ago, modern automatic riveting bears very little resemblance to such ponderous techniques.

The majority of riveted joints on domestic, electrical and automotive applications require rivets between $\frac{1}{32}$ in. and $\frac{1}{4}$ in. in diameter which are churned out by the million in two basic types—tubular and bifurcated, each having their own particular fields of use.

It is in the riveting of football boot soles, handbags, cardboard and plywood boxes that one normally finds the bifurcated type of rivet which, as its name implies, has a split or slotted shank. These fasteners do not require pre-drilled holes to be provided and are capable of being driven into thin sheet metal and plywood to give an almost indestructible fixing (try taking to pieces a riveted tea chest!). Bifurcated rivets may also be seen reinforcing the pockets of overalls and fixing the metal buttons in place. When a very neat finish is desired on the reverse side of a joint secured by a bifurcated rivet, the turned-back prongs may not be sufficiently smooth. Close inspection of a shopping bag or a dog lead will reveal a small shiny cap into which the rivet is automatically driven during the riveting operation.

So much for bifurcated rivets, but what do we use for securing the pivoting joints of tubular garden furniture and car windscreen wipers? Both of these applications require a very neat and smooth finish with the head and clinch (turned-over end) being similar in size and appearance. The requirement in this case is for a rivet which can be inserted into the work and given a single blow to form the turn-over without any buckling of the shank. In addition to this, for certain applications the joint must pivot with a specified tightness. This rather demanding requirement is very adequately filled by a specially-developed tubular rivet introduced a few years ago and now produced in extremely large quantities.

Further problems are presented when riveting fragile or brittle plastic components of the type commonly employed in the electrical industry. Metal terminals or even additional mouldings are often secured to such components. Joints of this type are further complicated by the material thickness varying greatly from one assembly to the next, while the manufacturers insist upon a tight fixing under all conditions without the bits and pieces becoming broken in the process. Again, continuous research has resulted in a rivet for the job which is a further version of a tubular rivet having a thin tapered wall at the hollow end, to allow the clinch to be formed without undue pressure while remaining sufficiently strong to provide a really secure fixing.

With the increasingly varied and specialised requirements of modern industry the "family" of rivets is being constantly enlarged and now includes shouldered rivets which serve as pivots—have a close look at

Heading, a detailed Riveting Machine built in Meccano by the author. Although it does not actually rivet, it reproduces all the movements of a full-size machine—even down to the realistic clatter!

Left, examples of the many different types of modern rivet, each one designed for its own particular job.

the handle of a one gallon paint can—and electrical terminal pins, the most common application of these being in the channel tuners and printed circuit boards of T.V. sets.

So much for the various types of rivets, but how on earth does one insert a rivet into a pile of components—certain of which have to be correctly positioned—and then form the rivet clinch? The answer here lies in the latest developments of automatic-feed riveting equipment. These machines are usually electrically operated and have a hopper into which the rivets are poured. When the driving motor is switched on, the rivets are sorted to the correct attitude to slide down a track, along which they then travel, finally coming to rest in a pair of spring-loaded jaws which place the rivets one at a time into the stack of components.

The problem of aligning the holes in the parts during assembly is overcome by the use of a device called a "spring centre anvil". The anvil—which forms the clinch of the rivet—has a spring-loaded pilot pin which protrudes sufficiently far to enable the components to be loaded on the pin which then passes through the holes. When the machine foot pedal is depressed by the operator, the rivet is driven through the spring-loaded jaws by a top punch, the hollow shank end of the rivet being located by the domed tip of the anvil pin to guide it down into the pile of components. When the pin is in its fully-down position, the profiled tip forms the clinch of the rivet. This sequence of events takes 1/5th of a second so it will be seen that, with the up-to-date equipment and rivets now available, the system of fastening is well able to cope with modern requirements.

We have discussed briefly the various types of rivets and means for inserting them but what is the best way to go about manufacturing around 100 million rivets in one week—the output of some of the larger producers? A visit to a modern rivet factory is quite a memorable experience due mainly to the terrific noise emitted from the rows of "heading machines" as they are called, munching their way through coils of wire rather like diners eating spaghetti!

There is no better system than Meccano for making your own model heading machine which will faithfully reproduce all the movements of the real thing and with the multiplicity of different movements the completed header is fascinating to watch. The model is not difficult to make and a very large stock of parts is not necessary. Before we plunge into the building details, however, a short description of the construction and operating sequence of the real machine is necessary.

Basically, the original version of the "heading" machine consists of a rectangular frame approximately the size of a small wardrobe laid on its back. This frame is supported on a cast iron stand to provide a conventional working height. Within the frame slides the ram, moving horizontally, this ram being driven by a substantial crankshaft mounted across the frame and running in journals provided towards the rear of the machine. The crank pin carries a connecting rod which, via a toggle linkage, propels the ram back and forth. The linkage is so arranged that the ram makes two strokes per crankshaft rev.

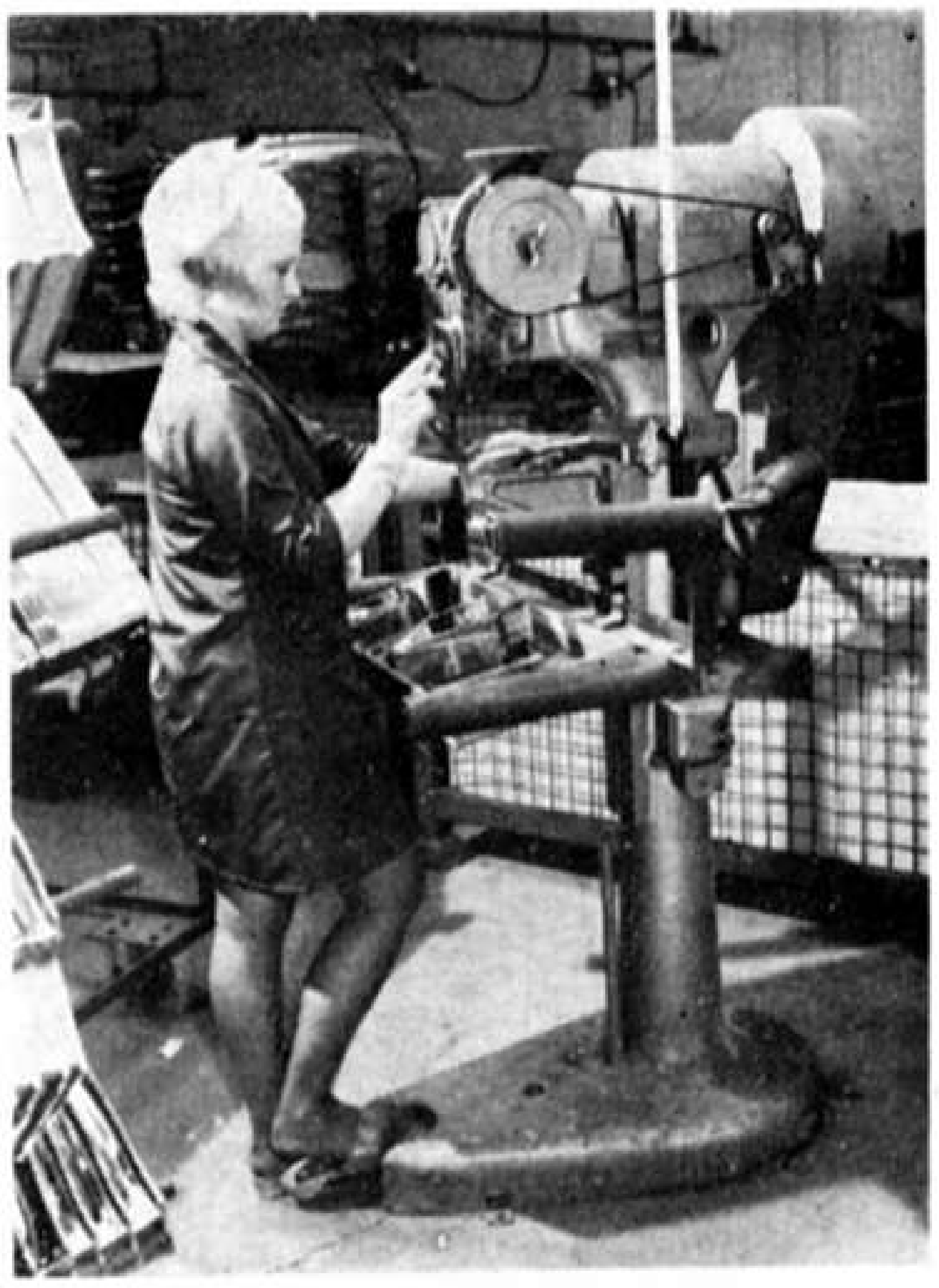
At the front of the ram is superimposed the tool slide which moves up and down, this being driven by a separate mechanism. The tool slide carries two press tools, one mounted above the other. As the rivet is formed in two blows, the sequence of events is that the ram moves forward with the tool slide "down" to partially form the rivet head. The ram then moves back when the tool slide is lifted up ready for the second forward stroke to complete the rivet.

Cams and eccentrics mounted on the outboard ends of the crankshaft drive the ancillary mechanisms while a large flywheel on the left-hand end keeps everything working smoothly. Two cams are fitted to the flywheel side, one for operating the punch mechanism to produce hollow rivets, while the other cam is employed to actuate a "knock-off" linkage which ejects the completed rivet into the catchment tray. Finally, on the left-hand side is an eccentric to operate the wire feed mechanism.

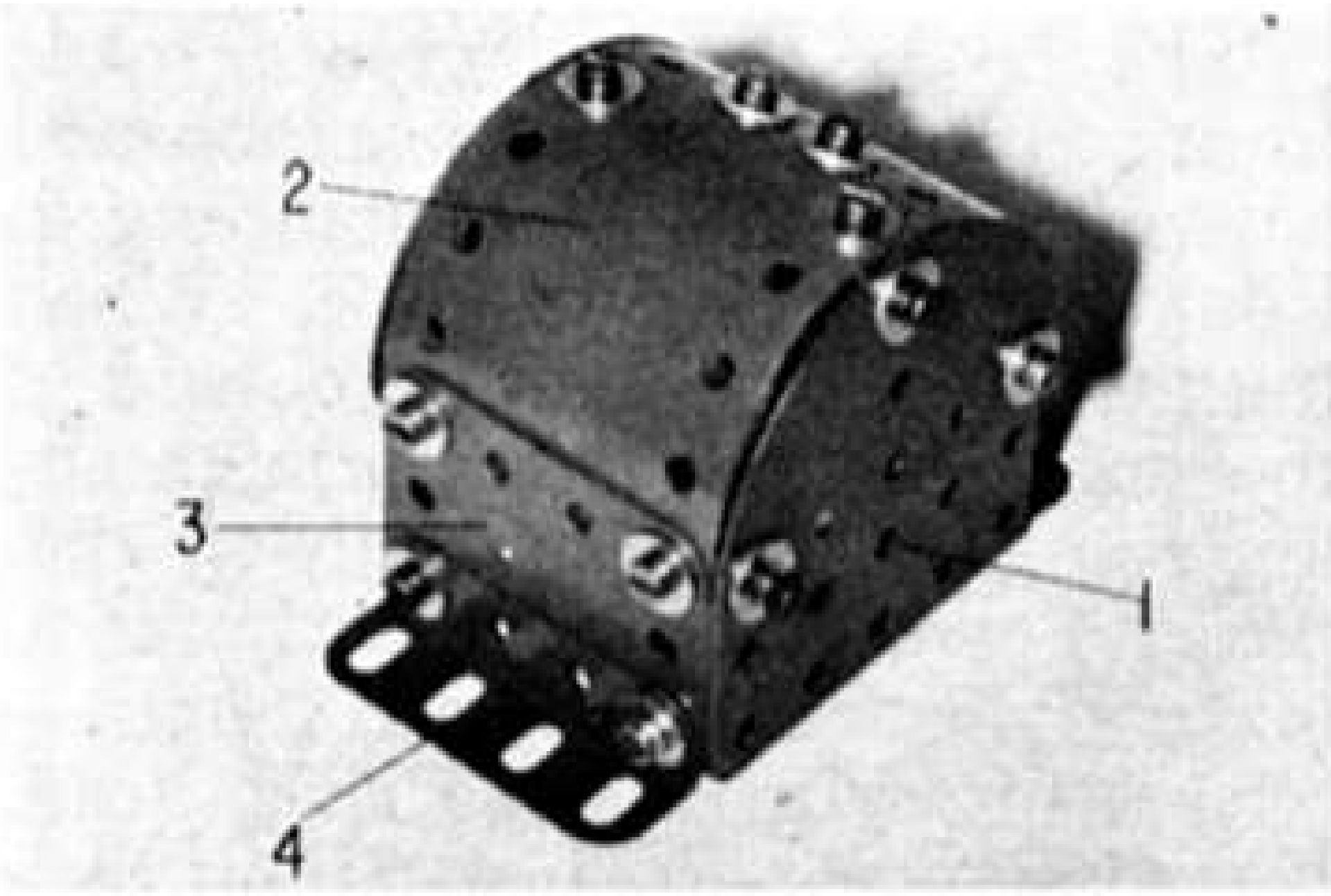
On the right-hand end of the crankshaft is located a cam for the toolslide lift mechanism, while a crank mounted on the extreme end operates the cut-off device, i.e. a mechanism which slices off the slugs of wire from which the rivets are produced. As mentioned above, the crankshaft is mounted towards the rear of the machine, so that long connecting rods extend towards the front to impart the cam and eccentric movements to the various mechanisms which are situated round the actual forging area.

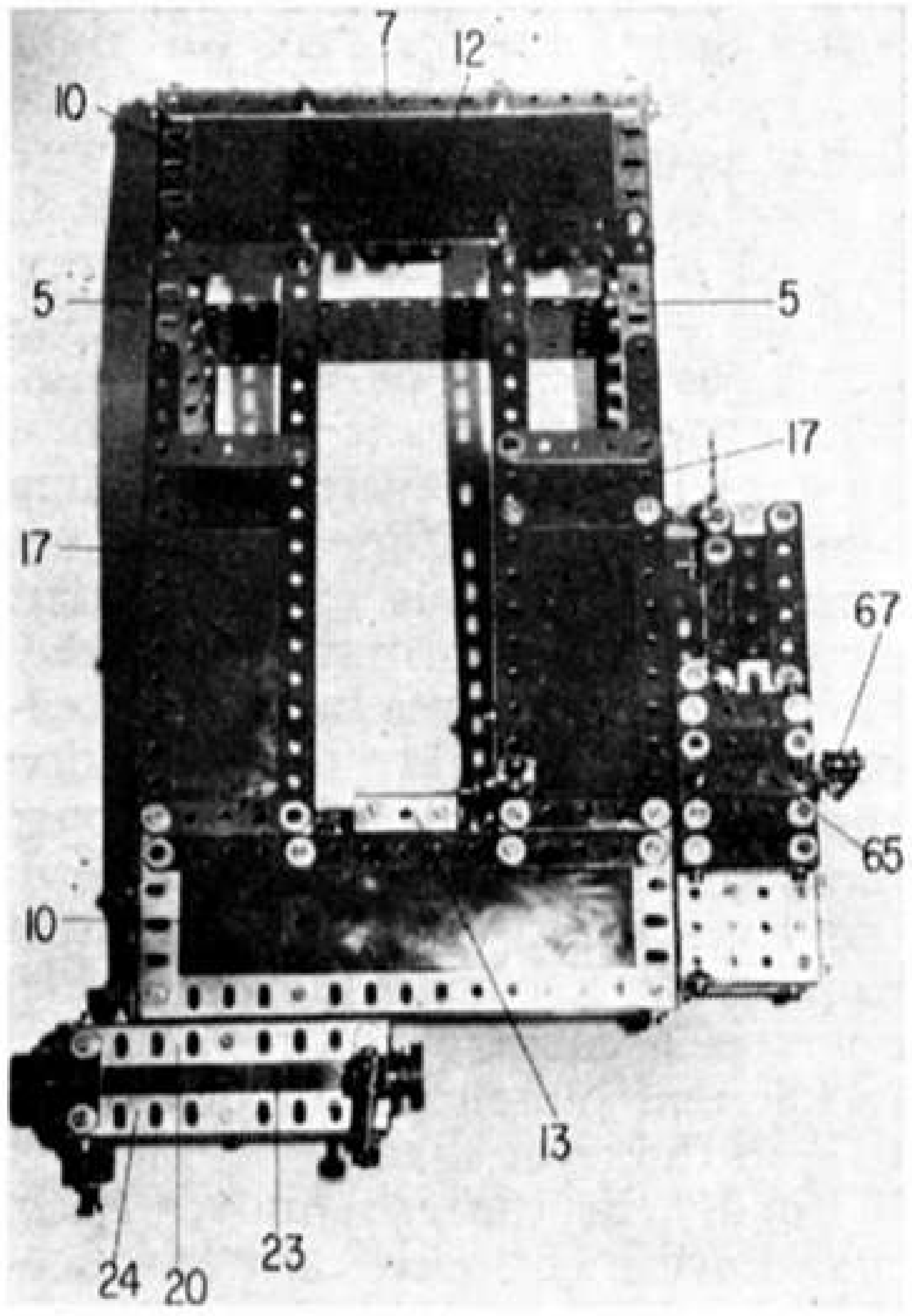
The rivets themselves are made from coils of wire which are mounted horizontally upon a reel standing in front of the forging machine. When the machine is operating, the end of the wire passes through straightening rollers and enters a cut-off die, the end projecting sufficiently far to make a rivet of the chosen length—plus a bit extra for the rivet head. The slug of wire is then cut off by a cutter slide, mounted on the right hand side of the machine. This cutter carries a little piece of wire across to the main die where it is pushed in by one of the two press tools moving backwards and forwards on the front of the ram. When the ram advances on its first forward stroke, the vertically sliding toolbox is in its "down" position. The slug of wire is given a smart clout to partially form the rivet head Now, the ram moves back, the toolbox is raised to its "top" position and the ram is driven forward once more on its final stroke to fully form the rivet head. At this instant, a cam on the left hand (flywheel side) operates a rocker, pushrod, second rocker and punch pin to produce a hole in the rivet shank.

Finally, as the ram moves back, the above-mentioned cam advances the punch pin further to eject the finished rivet from the die, where it is knocked off the punch by an extractor mechanism, again cam-operated from the left-hand side of the crankshaft. The wire feed is provided by an eccentric mounted also on the left-hand side of the crankshaft which operates a simple pawl and ratchet arrangement. There are two feed roller shafts, these being geared together and, incidentally, accounting for the only gears in the machine.



Riveting radiator-grille components on a B & TR Co. automatic-feed rivet-setting machine at the British Leyland (Austin Morris) factory at Cowley, Oxford.





Left, one of the two identical crankshaft bearing housings as it appears removed from the machine.

Below, a top view of the main body section without the crankshaft and internal mechanisms.

Model Construction

Turning now to the Meccano model, as already mentioned this is not unusually difficult to assemble although care should of course be taken to ensure framework rigidity and the smooth-running of moving parts. Construction begins with the two crankshaft bearing housings, both of which are identical in construction and may be built up as separate units for subsequent attachment to the machine frame.

Each side plate is made up of a Semi-circular Plate bolted to a 2½ × 1½ in. Flanged Plate 1. The pairs of side plates are joined by 2 in. Strips and a built-up flexible plate 2 comprising two 5½ × 1½ in. Flexible Plates overlapped two holes at their long edges and extended a further three holes each way by two 2½ × 1½ in. Flexible Plates 3. Angle Brackets join the Semi-circular Plates to the Flexible Plates, while mounting flanges are provided by 2 in. Angle Girders 4 bolted as shown.

Body Assembly

In the case of the body, four 12½ in. Angle Girders 5 provide the main side members, these being extended a further three holes forwards by four 5½ in. Angle Girders. The left-hand side panel is filled in by a 12½ × 2½ in. Strip Plate 6 and a 2½ × 2½ in. Flexible Plate, while a 9½ × 2½ in. Strip Plate and a 5½ × 2½ in. Flat Plate are used on the right-hand side. Both side panels are joined front and rear by four 7½ in. Angle Girders 7 while the rear corners and the front right-hand corner only are capped by vertical 2½ in. Angle Girders 8. The back of the body is enclosed by 5½ × 2½ in. and 2½ × 2½ in. Flexible Plates 9, similar Flexible Plates 10 being used to cover the front and rear of the top surface of the body. Plates 10 are fitted beneath the flanges of the frame members.

Two further 7½ in. Angle Girders are bolted across the inside of the body to reinforce the edges of the above-mentioned Flexible Plates, but note that, before fixing these Girders in place, each one has attached to its slotted flange two Flat Trunnions 11 (leave one free hole at each end.) These Trunnions eventually carry the two fore and aft rods on which the ram slides. The rear 7½ in. Girder also carries on its slotted flange a 1½ in. Angle Girder 12, fixed centrally. The forward-facing slotted flange of this short Girder carries at each end, a Hinge.

At the centre of the front 7½ in. Girder is fixed the die block, represented by a Channel Bearing 13 with its sides enclosed by a pair of 1 × ½ in. Angle Brackets. The portion of the Channel Bearing protruding below the Girder has bolted to it the 5-hole side of a Corner Gusset—one hole projecting each end. The downward-facing 4-hole side is on the left and carries a rearward-facing Double Bent Strip 14, the bottom Bolt also retaining an Angle Bracket, its free lug facing towards the front of the machine.

Now the two 7½ in. Girders may be bolted inside the frame, both with their round hole flanges facing the front of the machine. 7½ in. Strips overlay the edges of the Flexible Plates for neatness. The Angle Bracket on the bottom of the Corner Gusset is connected to the main frame by a 2½ in. Strip.

Using its round hole, an Angle Bracket is next bolted through one end hole of each of a pair of 9½ in. Angle Girders 15, a 1½ in. Corner Bracket 16 also being bolted—adjacent to the Angle Bracket—to the right-hand Girder. These Girders, round hole flanges vertical, are now fixed longitudinally within the frame to provide the edges of the ram slideway. Their rear ends are bolted direct to the 7½ in. cross-member Girder, while the front ends are attached by the slotted lugs of the two Angle Brackets to the other 7½ in. Angle Girder cross-member. When correctly adjusted by making full use of the slotted holes, the space between the 9½ in. Girder should be 2⅝ in., i.e. room for a 2½ in. Strip with $\frac{1}{16}$ in. clearance each side.

A pair of 5½ × 2½ in. Flexible Plates 17 are each extended one hole by two 2½ × 1½ in. Flexible Plates, these being bolted to partially fill in the space at each side of the ram slideway, the gap being at the rear. Suitable Strips overlay these Flexible Plates and 2½ in. Strips are fixed across each side panel as shown. The rear overlaying 2½ in. Strips serve also as a base upon which to bolt the front of the bearing housings. To support the rear of the housings two further 2½ in. Strips are bolted between Girders 15 and the 12½ in. main side-members.

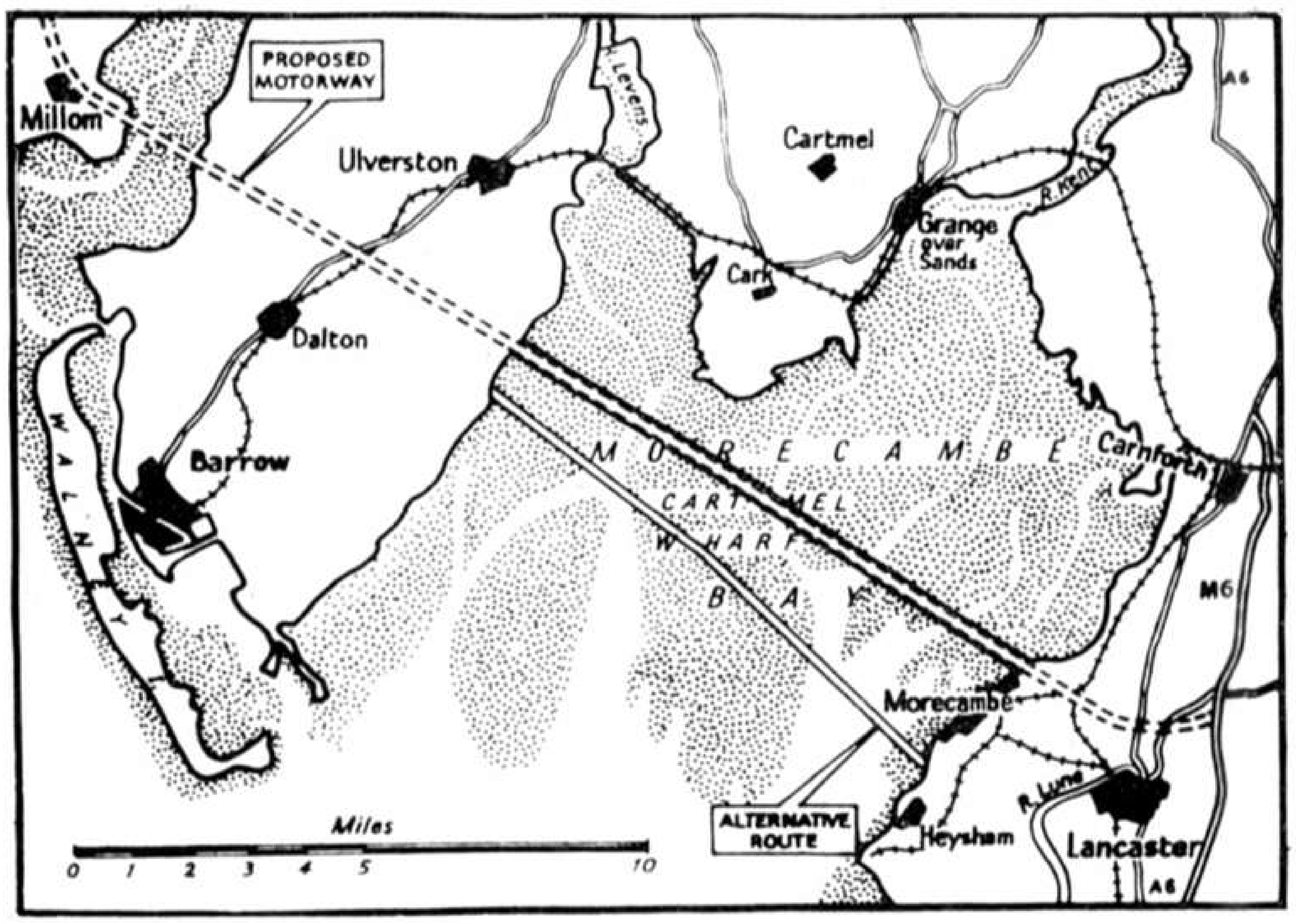
Fixed to the side of the front left-hand corner of the body is a vertical 2½ in. Angle Girder, secured by its slotted holes. The remaining flange projects outwards and to it is bolted, centrally, a rearwards-facing Double Bent Strip 18.

This now almost completes the body assembly and the bearing housings may be secured by bolting the 2½ in. Perforated Strips to the slotted flanges of the 2 in. Angle Girders. Using an 11½ in. Rod, check that all four bearings are precisely in line. Packing Washers should be added as necessary to bring bearings into line.

At the right-hand side of the front of the body is secured a 4½ × 2½ in. Flat Plate 19 fitted inside the frame. Both top and bottom left-hand fixing Bolts also secure, by their round hole flanges, a pair of 4½ in. Angle Girders 20 attached so that their ends project a distance of two holes from the left-hand side of the frame. A vertical 2½ in. Strip 21 joins the end holes of these Girders, thus forming the beginning of the feed roller assembly.

Secured to the forward-facing slotted flanges of the two Girders, at the right-hand end, is a 2½ × 1½ in. Flanged Plate 22 and, at the opposite end, are two forward-facing 1½ in. Angle Girders. The space between these parts—at the top only—is filled in by a pair of 2½ × 1½ in. Flexible Plates 23, overlapped one hole. Note that the right-hand Bolt also secures an over-

(*continued on page* 457)



Britain's Searoad of Tomorrow

By

Arthur Nettleton

A NORTH-WEST Lancashire transport route, long disused for regular purposes, may shortly be revived in a modern form. It is the one which in bygone days linked the opposite shores of Morecambe Bay, and which used to be the concern of the canons of Cartmel Priory.

They provided a guide to conduct walkers, horsemen, and carriage passengers across the quicksands which might easily engulf them. In stagecoach days the same risky route was regularly followed by the Lancaster–Barrow services.

Monuments in churchyards hereabouts reveal the extent of the hazards, inscriptions referring to unlucky travellers who failed to beat the swift incoming tide or became victims of the sinking sands.

Milestones near Cartmel also provide a link with that period, for they quote the direct, "over sands" route to Lancaster, though the motorist who allowed himself to be enticed by these stones would be rash indeed!

An old inn at Hest Bank, near Carnforth, is another reminder of the old route. The building has an oddly placed window commanding the Bay, and in coaching times a lamp was kept burning here as a landmark for vehicles making the crossing.

Railway pioneers respected the treacherous conditions of the sands. They took their Lancaster–Barrow line across a more northerly and shorter cross-sands route near the head of the Bay, though this entailed a detour via Arnside and Grange-over-Sands.

Now a new chapter in the story of Morecambe Bay transport is being written. A scheme to span the Bay along a route near the old crossing has been undergoing examination, and scientific tests have been in progress to determine the feasibility of such a project.

In reality it has not been prompted primarily for transport purposes, but has been put forward as a means of meeting the need for more water. The idea is to build an eleven-mile barrage or dam from a point near Hest Bank to another south of Ulverston, thus impounding the waters of the Kent and the Leven, the two rivers which empty into the Bay.

In this way a lake of freshwater would be created. It would have a surface area of 40 square miles, and would supply 200 million gallons of water a day to cities and towns.

The dam, however, would also be designed with two carriageways, each three lanes wide. A central reservation about 30 ft. wide would be left for a railway, pipe lines, and other services.

In fact, the "off side" benefits would be just as useful as the reservoir itself. As a short-cut across the Bay, it would reduce the distance between Lancaster and Barrow-in-Furness from about 45 miles to 18 miles.

One suggestion is to build a monorailway connecting Lancaster and Morecambe with Barrow, taking this along the dam. It is considered possible to provide a monorail service operating at such a high speed that Lancaster and Barrow would be within 15 minutes of each other.

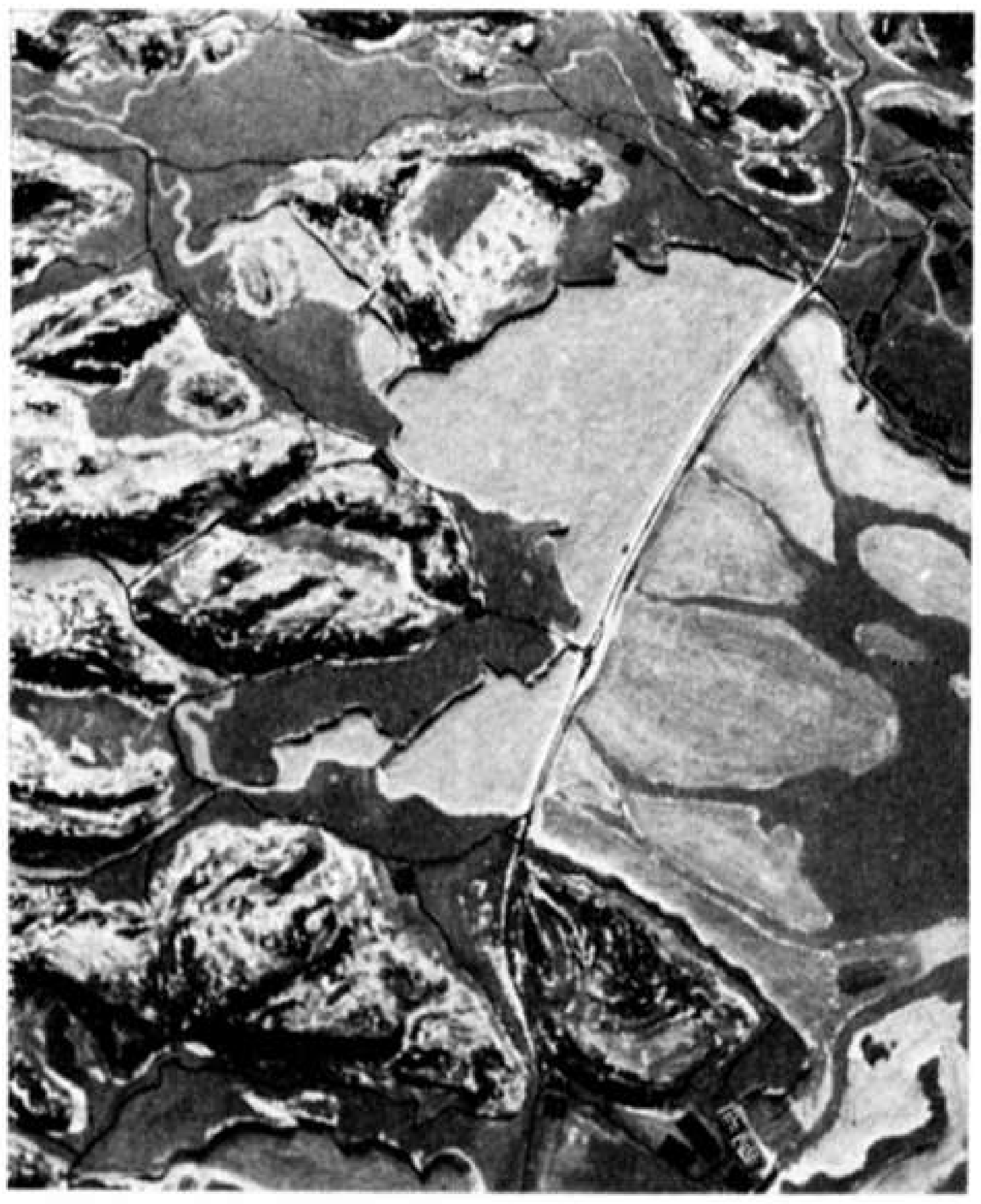
Equally exciting is the idea of using the lake above the dam for aquatic pursuits—yachting, fishing, skin-diving, and water ski-ing.

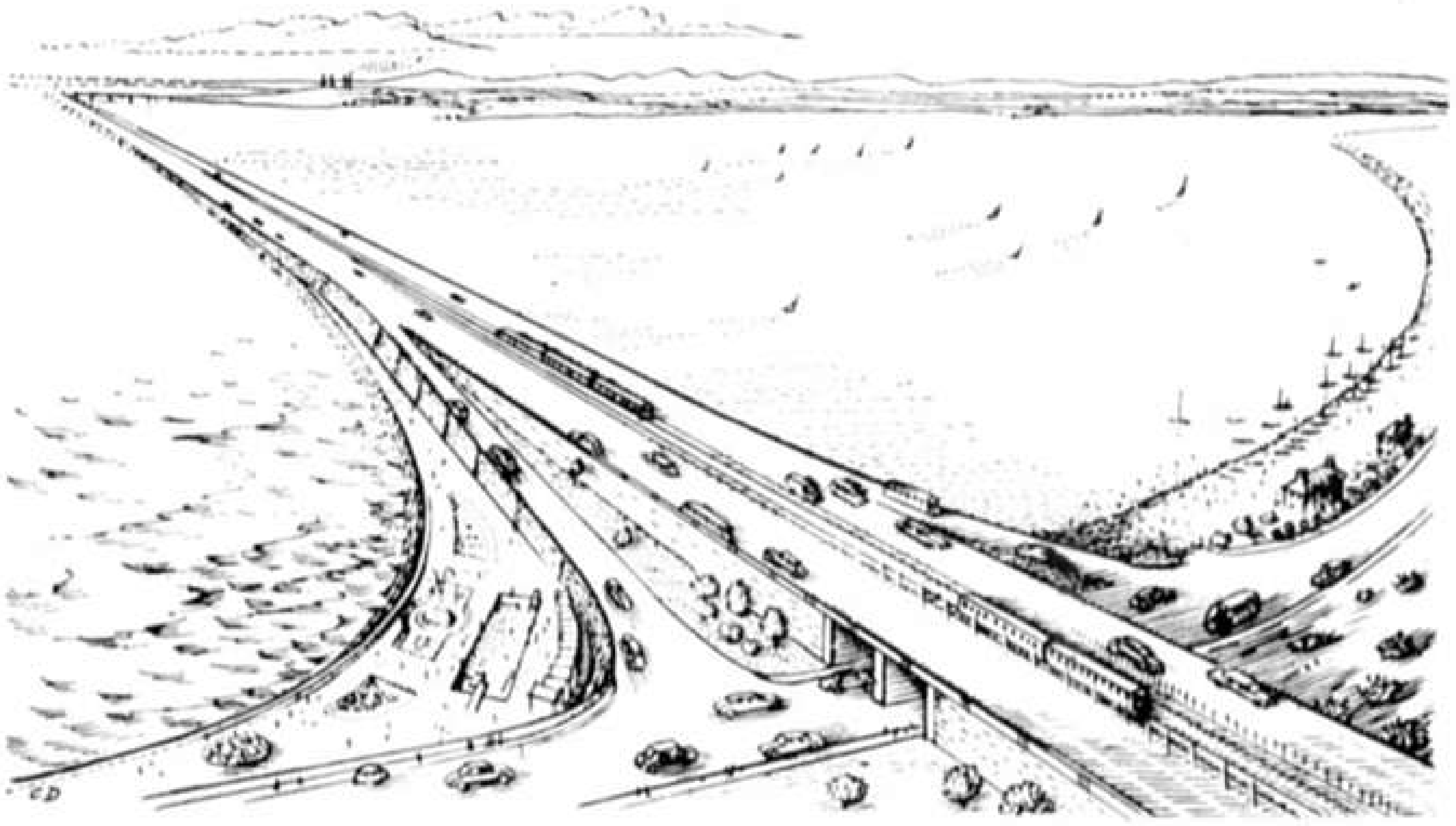
Experts also envisage the possibility of connecting this man-made lake with Windermere, along the route of the River Leven. It could be done with a series of locks similar to those which make long stretches of the Thames navigable by small craft.

How can the dam be built?

One of the first steps in seeking the answer has been

A lamp used to be kept burning in an upper window of this inn at Hest Bank, near Carnforth, to guide travellers safely across the sands of Morecambe Bay, on the short route between Cartmel and Lancaster.





Left, relief map of scheme. Above, artist's sketch, showing completed barrage.

to make a comprehensive study of the area to find the problems involved. Such studies were started in 1967, with Government backing, and have been carried out at the national Hydraulics Research Station, Wallingford, Berkshire.

The set-up has included a large tide model of the Bay constructed at a cost of £125,000, including the necessary field work. The Admiralty have helped in designing this scale model, and other assistance has come from Hunting Surveys Ltd.

Aspects scientifically considered have included the speed and direction of sea and river currents, the salinity and temperature of the water, tide levels at coastal sites, and taking seabed samples. This information has been augmented by Admiralty charts of the Bay, and by the results of a radioactive tracer survey.

The purpose of these preliminary studies has been not only to determine how a dam could best be built, but also to forecast its effect on other parts of the Bay, especially at the seaside resort of Morecambe and the ports of Heysham, Fleetwood, and Barrow-in-Furness.

Practical investigations have included the erection of three drilling towers in Morecambe Bay to test the geological formation of the sea bed. The bore-holes were planned to go down 300 ft. in search of bed rock, but in some parts of the Bay firm foundations have been struck without drilling so deeply.

Help has been enlisted overseas too. A Dutch expert, Professor Thijsse, of Delft University, has visited the area and applied his long experience to the project.

He has stated that the construction of a barrage may take four years, but that it is technically possible, provided certain points are met. Most important of these will be the need to take the tides into account.

Before the dam is closed, water will rush in and out through the ever-narrowing gap as the tides ebb and flow. The engineers will have to ensure that the dam remains intact against this powerful onslaught.

Once the barrage has been sealed, however, no major problems are likely to arise.

Aerial photographs of the Bay and the surrounding mudflats have also helped in planning the scheme, and echo sounders have been useful in determining the depth of the sea floor.

Whether this ambitious enterprise will become a reality has yet to be officially decided. It has its opponents as well as its supporters.

Critics declare that the precarious shifting sands will form a poor foundation for a barrier. The swift tide, when backed by a south-westerly gale, will exert enormous force against any embankment.

Other opponents fear that, despite intensive surveys and tests with scale models, not enough is known about the effects on the shipping channels in the Heysham area.

Fishermen, especially those concerned with the Morecambe Bay cockle beds, fear that their livelihood would be jeopardised if the natural state of the Bay was altered.

Supporters believe that, once the dam is built, the salt in the sand on the bed of the reservoir will soon be washed away by the steady flow of fresh water coming down the Lakeland rivers. Then this water can be impounded to provide a continuous supply for the Manchester area.

There is a wider idea to pipe some of the fresh water to the taps of the West Riding, too. Consultants say it could be done by "leap-frogging" the Pennines with pumping stations and creating a vast new storage reservoir near Hellifield.

Fantastic notions? Building long-distance barriers across the sea is nothing new in this twentieth century. Chesapeake Bay, separating Maryland and Virginia, has an oversea route of dams, bridges, and tunnels, while Holland has enclosed the Zuyder Zee by erecting a 20-mile barrage and has made it into a vast fresh water lake, as well as reclaiming 500,000 acres of land for agriculture.

Making better use of Morecambe Bay has been a dream for very many years. George Stephenson suggested a railway track in a great arc round the coast. Still later a railway ferry service was planned, and a pier to receive it was actually built near Barrow. But the idea was not pursued further and the pier tumbled.

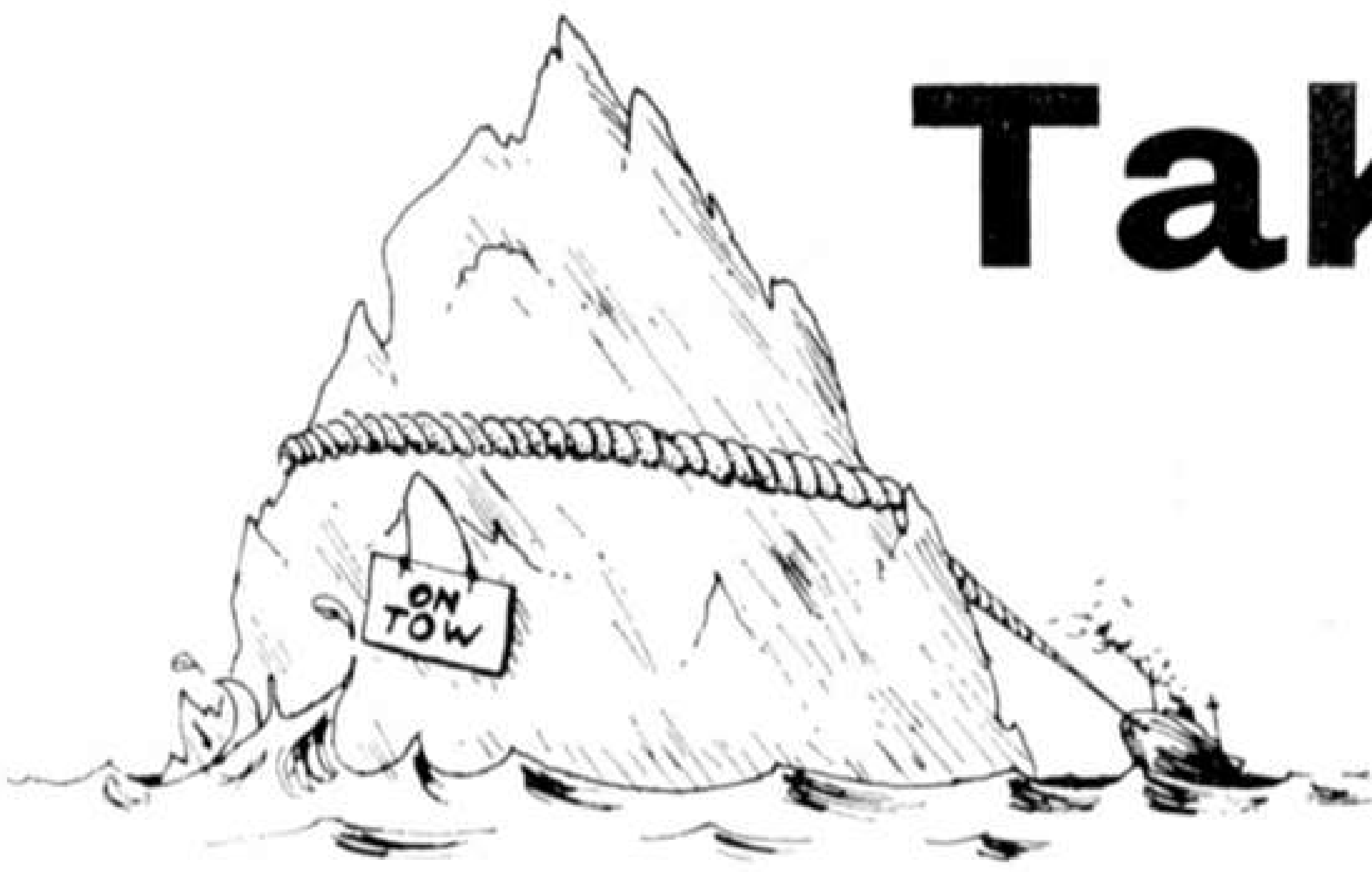
Today's expertise and engineering knowledge may not only soon make the Morecambe Bay barrage a reality, but may encourage similar schemes at other points along the U.K. coastline.

There are proposals to create a freshwater lake in the Dee estuary, and large-scale model tests have been carried out to discover the best way of doing this. The model was built to represent the coastline from Rhyl to Hoylake, and to show how the area would probably be altered if a barrage was constructed from one side of the estuary to the other.

Blocking the Wash in the same way, to reclaim land from the sea and shorten the route for East Coast traffic, has also been put forward.

Taking Bergs in Tow

BY E. R. YARHAM, F.R.G.S.



ICEBERG hunters returned to Lowestoft at the beginning of the year after tracking down their "prey" off the south-west coast of Greenland. Earlier the *Lady of Essex* (a 127 ft. vessel, ex-Norwegian passenger-cargo ferry), carrying a helicopter, and with a team of French scientists and oceanographers on board, had left for the Arctic. Working with a Danish tug, the team experimented with blasting icebergs, using explosives, and also towing smaller bergs. Considerable research has been carried out into iceberg routes and patterns ashore, and the *Lady of Essex* followed this up with observations at sea. For towing, a great length of nylon rope was passed around the icebergs, work which brought its hazardous moments as the bergs tilted unexpectedly. The motive behind the experiments was the fact that the area where the scientists carried out their tests is one where there is a possibility of drilling for gas and oil. But before this can start the iceberg problem must be solved. Icebergs would be a great threat to static rigs and to any search operations in the area.

Towing icebergs as envisaged off south-west Greenland is, one might say, negative. The purpose is merely to get rid of a nuisance. An idea which has been put forward by two American scientists, Dr. William Campbell and Dr. Wilford Weeks, is much more positive. This involves towing icebergs from the Arctic and Antarctic to coastal communities for use as sources of fresh water, so turning a dangerous liability into a valuable asset. In a paper read at an International Symposium on the Hydrology of Glaciers at Cambridge, the two scientists divided the problem into four main parts: (1) the location of a suitable supply of icebergs; (2) the calculation of the minimum power requirements necessary to transport icebergs to locations where fresh water is needed; (3) the calculation of the amount of ice that will be melted in transport; and (4) the estimation of the overall feasibility of the venture. Problems of iceberg selection are likely to be simplified in the next few years by the availability of improved photography from polar-orbiting satellites. In the new photographs it will be possible to identify individual objects with dimensions of approximately 100 yards.

Interest in the subject continues to be stimulated by the increasing need for inexpensive fresh water in a number of areas in the world. Weeks and Campbell say that in choosing a test area it is first necessary to locate a suitable supply of icebergs. The main sources are the great ice sheets which cover Greenland and Antarctica. Only one-ninth of the mass of an iceberg is visible above water, so that a berg 250 ft. high above the surface has a depth of about 2,000 ft. below it. An iceberg gradually decreases in size owing to melting, erosion, and calving. The melting is effected both by the sun and the entry of the berg into warmer waters. Erosion is caused by the swell, wave-cutting, and rain. Calving, the breaking off of masses of ice from the main berg, often disturbs the balance and causes it to roll over.

There are different types of iceberg. The huge, flat-topped tabular ones are characteristic of the Antarctic. They have little superstructure, and therefore follow the currents rather than sailing before the wind. Drydocks have two peaks with a low middle. Pinnacles have one peak. They erode quicker than other types because they ride higher and have a large proportion of exposed surface. These bergs travel up to 20 miles a day, although the average speed is 10 miles. There are also dome-shaped bergs, and growlers, which mark the disintegration of large icebergs. This type is very unstable, and growlers are continually rolling and hissing in the water.

Hydrologists estimate that the total amount of water in existence—in the oceans, ice-fields, lakes, rivers, rocks and soil, and in the atmosphere—is about 326 million cubic miles. Of this total, something over two per cent, about 7.2 million cubic miles, is "stored" in the world's ice-caps and glaciers that cover nearly seven million square miles, or about 10 per cent of the earth's land surface. Much of this ice averages more than a mile in thickness. The Antarctic ice-cap, by far the greatest single source of water stored in ice, is estimated to cover about six million square miles. The vast central shield averages 10,788 ft. in thickness, with a maximum so far recorded of 15,407 ft., almost three miles. The deepest is probably 100,000 years old. If all the ice of Antarctica melted at a uniform rate it would yield about 6.5 million cubic miles of water that would feed the Mississippi for more than 50,000 years; all United States rivers for 18,000 years; and the Amazon for about 5,000 years.

In the north, Antarctica is matched, if not counterbalanced, by Greenland. This is a gigantic island of 827,300 square miles, and is in fact the largest island in the world. Geologically it is really a vast saucer of rock filled with ice. French geologists sounded and found the ice cap at least 10,000 ft. in depth at the centre. Every spring 18,000 cubic miles of ice break off from the glaciers and drift south as icebergs towards the Atlantic shipping lanes. Of the 7,000 or more icebergs "calved" each year from the mother glaciers of western Greenland—off the coasts of which the *Lady of Essex* was working in the spring of 1971—an average of 450 drift as far south as Newfoundland (latitude 48 degrees N.). The journey of about 3,200 miles takes eleven months or so at an average speed of 10 miles a day. The average number of icebergs located south of the 48th parallel during the first half of this century was 396, but the numbers vary enormously from year to year. In 1924 only 15 icebergs were definitely reported, but five years later over 1,300 were sighted. There is about one comparatively ice-free season in ten. The Atlantic iceberg season extends from April to July.

The two American scientists say that in choosing a "test" area the first need is to locate a suitable supply of icebergs that are tabular, so that the dangers associated with rolling are avoided. An approximately circular or square iceberg is desirable, but, in the Arctic, sources of large, tabular icebergs are not common. In the Antarctic, where 80 per cent of the world's fresh water—as distinct from salt water—is contained in the ice-cap, the chief sources of tabular icebergs are the large ice shelves that fringe the continent. The most promising sites are the Ross Ice Shelf which would supply icebergs at locations suitable for transport to the arid areas along the west coast of South America, and the Amery Ice Shelf which would supply icebergs at locations accessible to Australia. Another possibility is the Filchner Ice Shelf which could supply bergs to the Namib Desert on the south-west coast of Africa.

The problem of the melting and deterioration of an iceberg as it passes through warm waters is important. Examining three transits, with minimum distances varying between about 3,240 and 4,680 miles, and by towing the icebergs at a realistic average speed of one knot, a period of between 120 to 160 days would be required. The significance of the melting problem is underlined when it is considered that surface water temperatures at the northern ends of the transits are in excess of 20 degrees C. (68 degrees F.) and that temperatures during more than half of the towing distances are in excess of 5 degrees C. (41 degrees F.). However, if it proves economically feasible to tow the larger icebergs there will still be large amounts of ice left when a berg reaches its destination. For example in the Amery–Australia traverse, if the operation starts with a "square" iceberg with lateral dimensions of 1,000 metres, and a thickness of 250 metres, it would end up with an iceberg of 760 × 760 × 130 metres in size, which is 30 per cent of the starting ice. For the Ross–Atecama transit under the same conditions the final block of ice would be 660 × 660 × 80 metres, which is 14 per cent of the starting size. Drs. Campbell and Weeks conclude, "Taking every factor into consideration, the in-transit melting, though significant, is not prohibitive".

As for power requirements, it is calculated that resistance of an iceberg being hauled through the water rises as the square of the velocity, and therefore it is of very considerable economic advantage to tow at the lowest practicable velocity. A single seven or eight thousand horse-power tug, moving an iceberg at about a half knot would have better chance of success than rows of tugs all churning away at once. Slow, steady progress along a suitable ocean current would seem to be the best mode of advance. Estimating the economic feasibility depends on costs of power required as well as the price the water will bring at its destination. One hypothetical calculation starts with lateral dimensions of 2,700 metres, and towing at a rate of about half a knot. Starting from the Antarctic the tug would arrive on the coast of north-western Australia with an iceberg 2,460 × 2,460 × 130 metres in size. This amounts to about 207,000,000,000 gallons of ice, which would be worth about 5.5 million dollars (say £2,300,000), which is one-tenth of the cost of the same quantity of desalinated sea water.

The cost of operating the tug for the twelve day trip to the Antarctic and the 250 day trip back would be slightly under one million dollars (about £420,000). On the other hand a similar iceberg towed from the Ross Shelf to the Atacama Desert would arrive as 101,000,000,000 gallons of ice, which would be worth 2.7 million dollars (around £1,150,000), and the cost of transportation for the 373 day round-trip would be 1.3 million dollars (approx. £500,000). The quality of the iceberg water would be excellent, since the icesheet from which bergs originate is essentially distilled water, and there would be very little intrusion of salt water into the ice during transit. An interesting aside on this is a story reported lately of how an enterprising American firm is exporting ice from the Labrador coast in two-pound bags to pollution conscious Americans. A similar venture is thriving in Greenland. Ice two thousand years old and guaranteed free from pollution has been successfully launched as an export. A report from the Royal Greenland Trade Department (1971) says that 100 tons has been sold on the continent of Europe and in Japan since it was introduced in 1970.

Although millions of tons of ice are ceaselessly breaking away from the polar ice caps these are just as constantly being replenished. Icebergs can be towed away for the production of fresh water, it seems, and ice can be exported to jaded city dwellers. But have the ice caps any other potential value? One of the properties of ice is that it can arrest natural decay almost indefinitely. Some years ago Russian scientists enjoyed (if that is the appropriate word) a banquet of mammoth steaks. They had been cut from carcases of some of these extinct hairy elephants that had been swallowed in the bogs of northern Siberia, had been subsequently refrigerated, and preserved for thousands of years. Professor F. Plummer, a South African scientist, suggested we ought to use the Antarctic as a refrigerator for the world's surplus food. If this had been done years ago, he argued, much could have been done to relieve shortages in the immediate post-war years in Europe and south-east Asia. When the Duke of Edinburgh visited the Antarctic he put forward a similar suggestion.

AMONG THE MODEL-BUILDERS

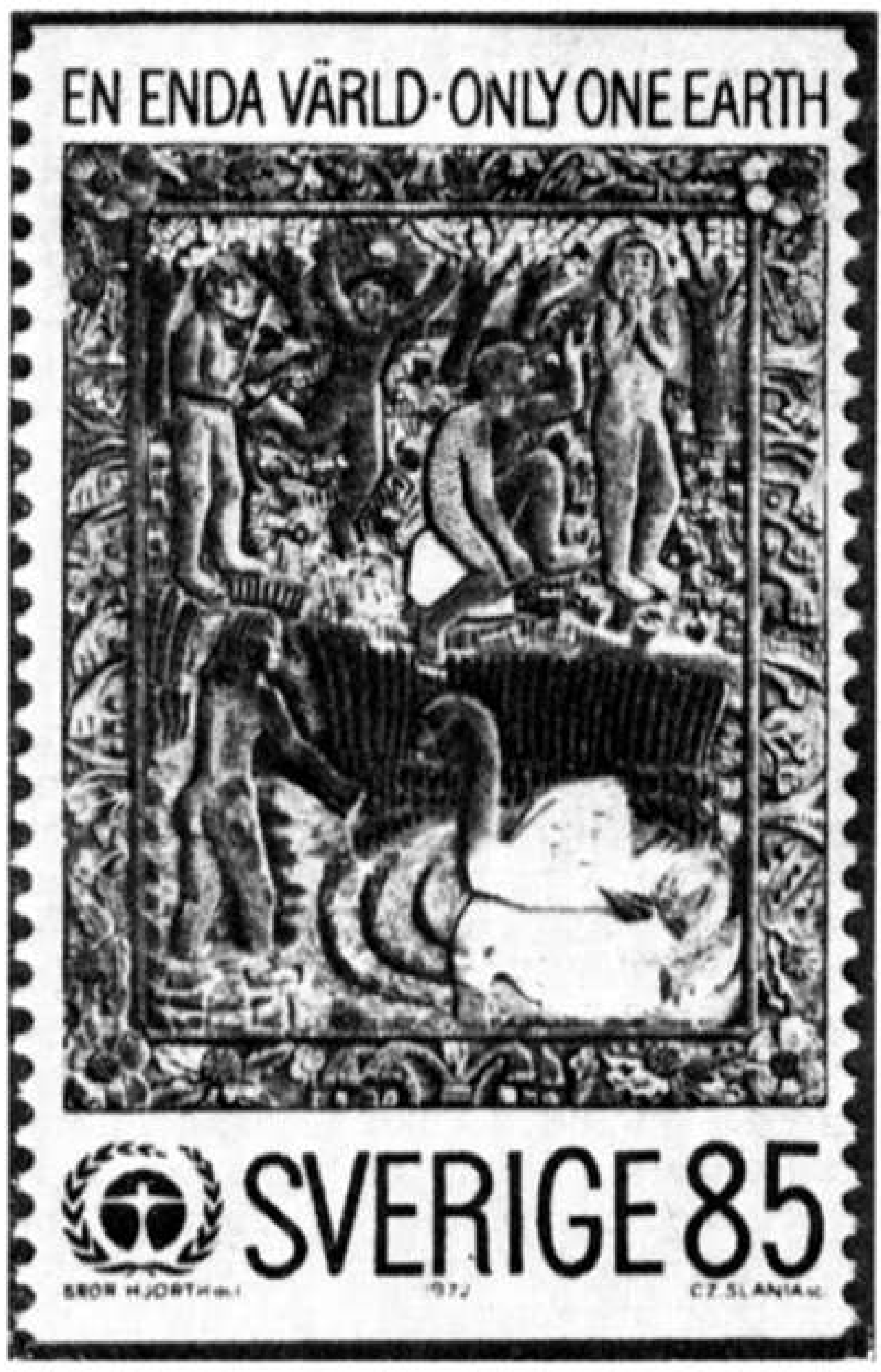
(continued from page 445)

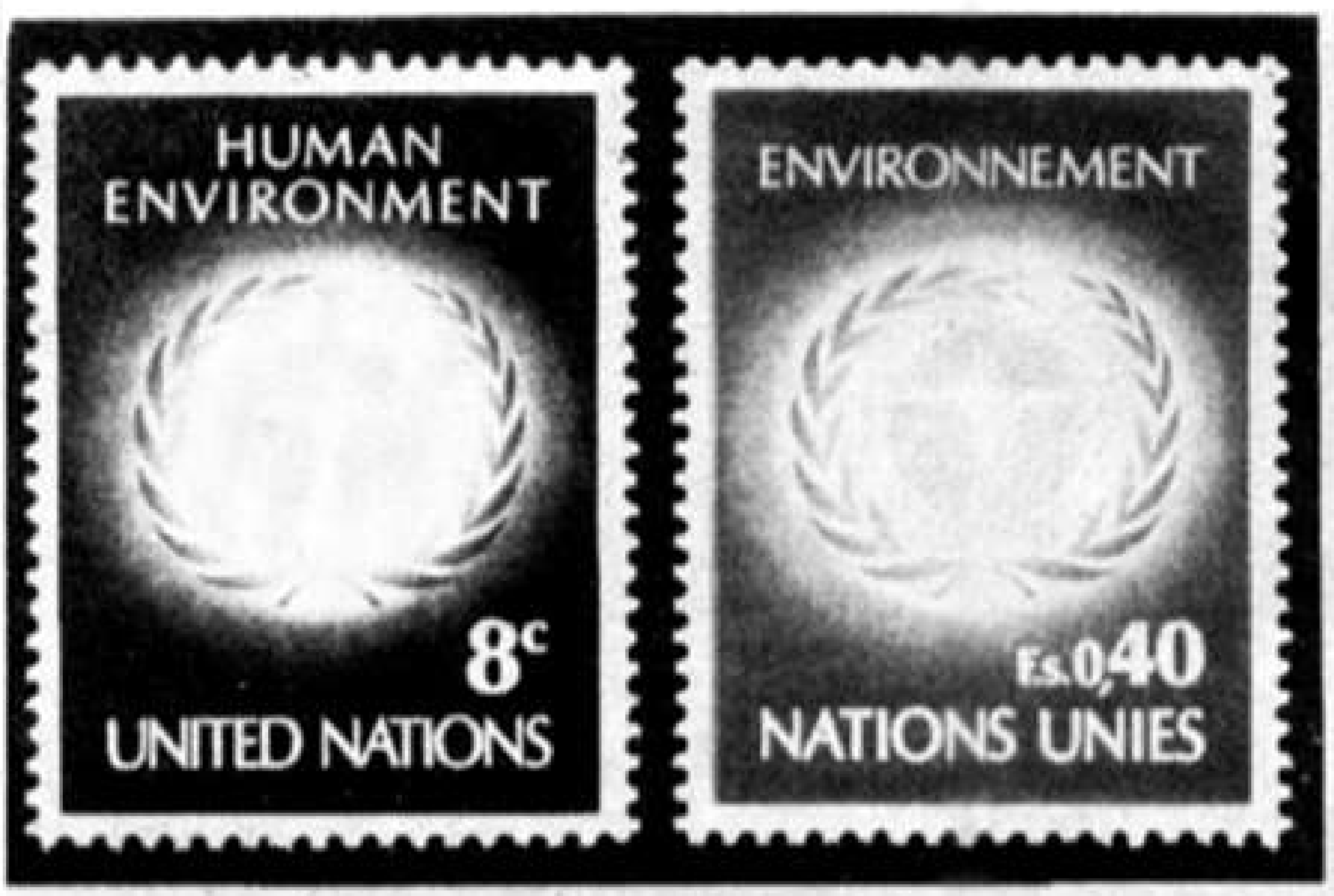
should be secured by a $\frac{3}{8}$ in. Bolt, or one of the long $\frac{7}{32}$ in. Grub Screws.

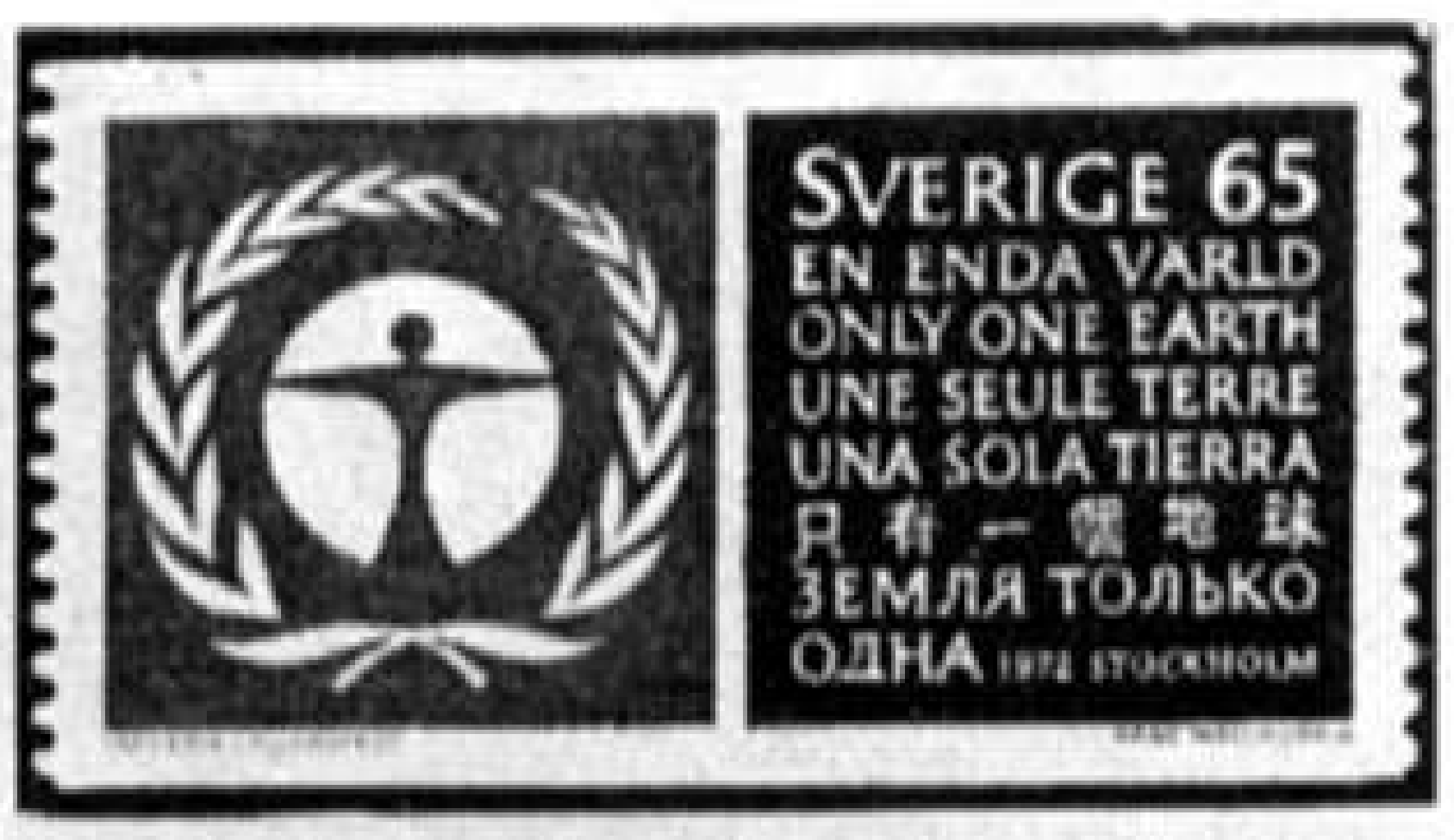
This idea will of course work only when the unit is positioned as shown, with the framework of the model preventing the Sprocket and Collar 1 assembly from sliding out of engagement with Collar 3. If the requirements of the model prevent this, then Collars 1 and 3 should *both* be fixed on the Rod with small $\frac{7}{64}$ in. Grub Screws and the Sprocket secured to these in the same way as if a Coupling were used.

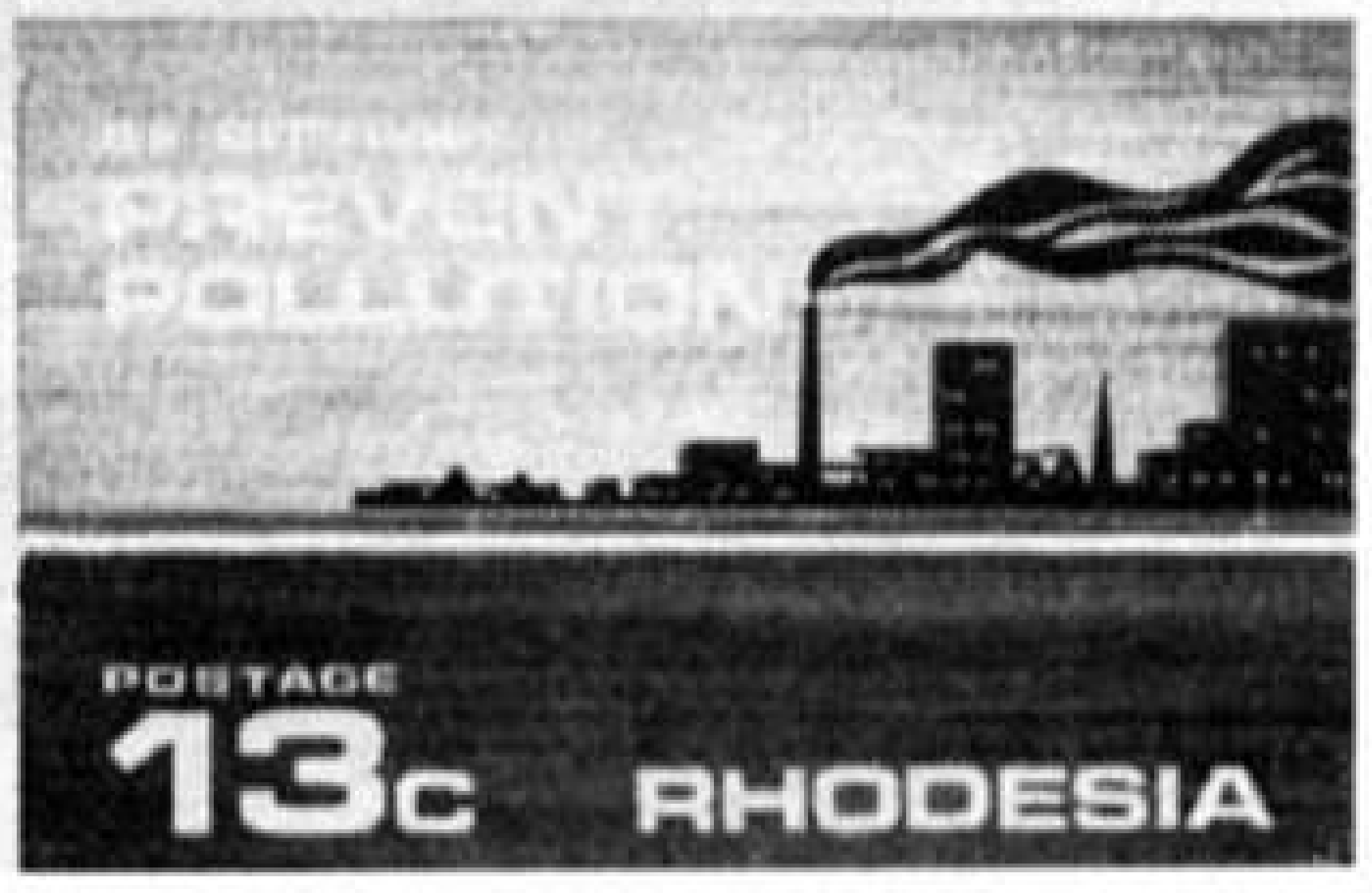
Our other Plastic/metal hint concerns the use of a Plastic Meccano Axle Rod within a metal Meccano model. There are occasions when a Plastic Axle could be used to advantage in a standard model—as a crane winding drum, for instance—but until now there has been no effective way of mounting it in position and certainly no way of fitting standard Pulleys or gears to it for driving purposes. Both these problems can be overcome, however, by using the method illustrated in the accompanying picture. The two plain Axles in the Plastic Meccano system are hollow and it will be found that the hollow bore fits a standard Meccano Rod very nicely. If a Rod is simply inserted in the bore, of course, the Plastic Axle will just revolve on the Rod and serve no useful purpose, but it can be rigidly secured by "screwing" a Cord Anchoring Spring 1 onto each end of the metal Rod 2 and as far as possible into the end of the Plastic Axle 3. This may be doubtful engineering practice, but it certainly works!

Full credit for both these valuable hints goes to Mr. Pat Lewis of Formby, Lancs, whom I would like to thank for continuing to pass on his ideas to me from time to time.









Saving the Environment Stamps,

by J. A. Mackay

FROM 5 to 16 June, Stockholm was the venue of a great United Nations conference on human environment, attended by delegates from all over the world. To mark the occasion Sweden issued two stamps featuring the UN conference emblem and the motto "Only one Earth". The 65 ore stamp bore the motto in six languages—Swedish, English, French, Spanish, Chinese and Russian, while the 85 ore had it in English and Swedish. The latter stamp reproduced a wooden bas-relief symbolising Spring, by the artist Bror Hjorth.

The conference was not only one of the largest international gatherings in recent years but also the most important. It was the first time in history that men and women sat down together to discuss the environment problems common to humanity and the whole world. The delegates met to discuss what had to be done to put an end to the destruction of our environment. They did this conscious of the fact that we are now in the throes of a world-wide problem—pollution. The fish poisoned by mercury and the atmosphere polluted by sulphur fumes affect people all over the globe, regardless of national boundaries. These and similar problems can only be solved by international co-operation.

Four years ago Sweden suggested that the United Nations Economic and Social Council should take up the question of an environmental conservation conference. In December 1968 the UN General Assembly gave its assent and the conference was planned for June 1972. In the summer of 1969 the Swedish government invited the UN to hold the conference in Stockholm and the invitation was accepted the following December. A preparatory committee was formed, with delegates from Sweden and 26 other countries, under the secretaryship of Maurice F. Strong, a Canadian.

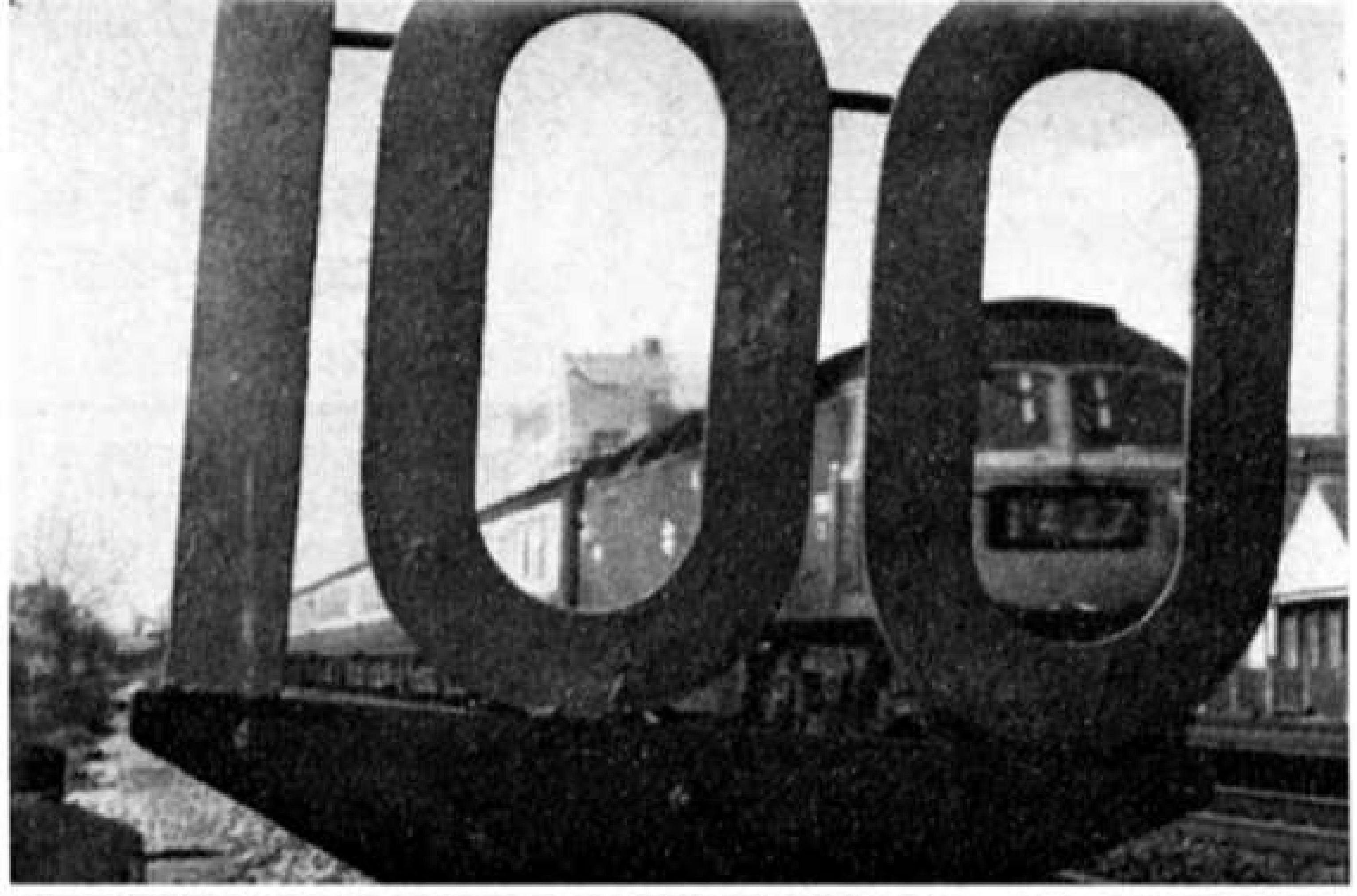
At the conference nearly 80 national reports on environmental problems were submitted to delegates. One of the chief aims of the conference has been to focus the interest of both governments and the general public on the problems of preserving the world and its natural resources for the benefit of mankind. The conference has been described as an international doomwatch, giving warning of problems in various parts of the world and how best they can be combated.

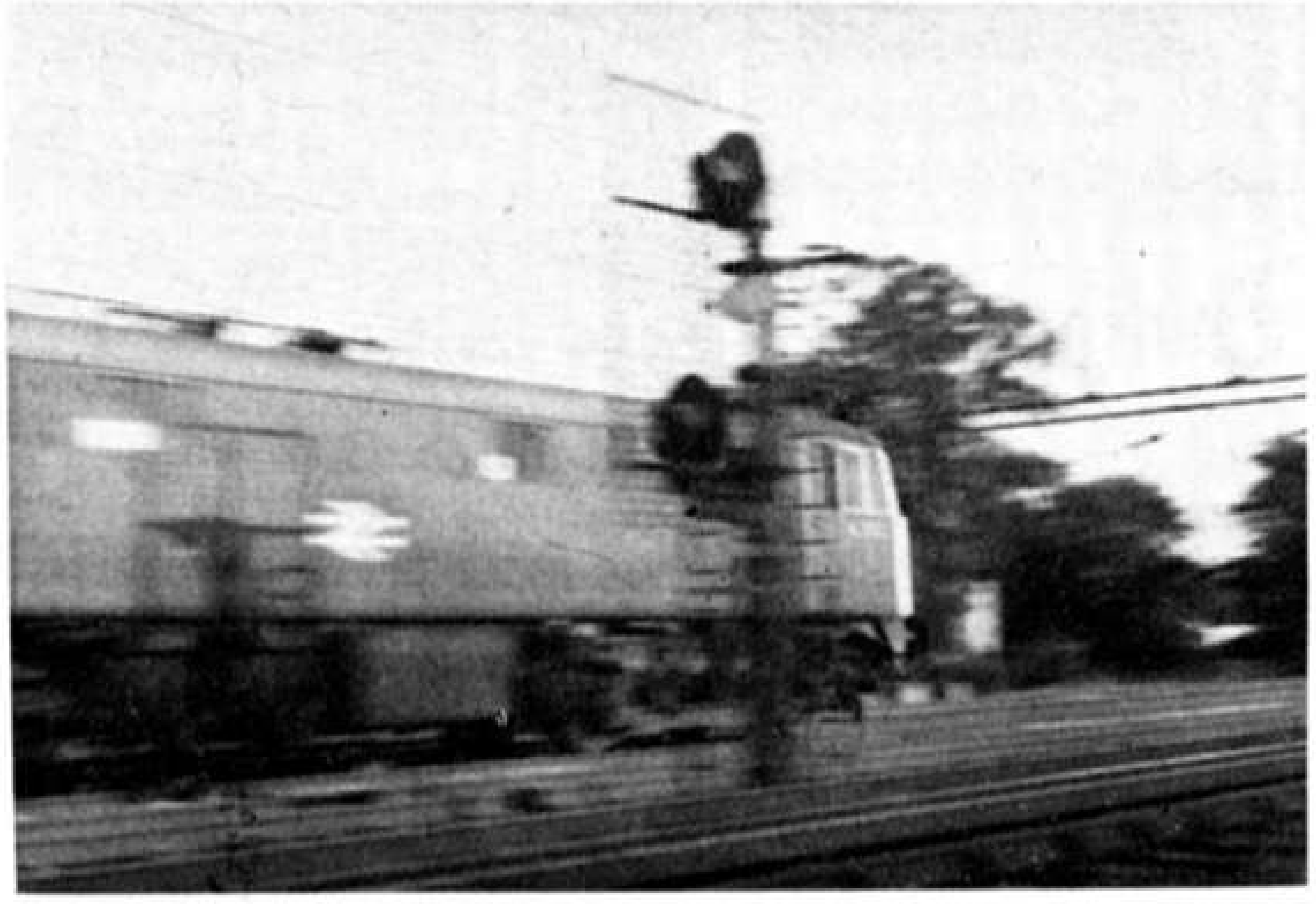
For many years the United Nations and its specialised agencies have been concerned with such problems as hazards to human health, conservation of natural resources, preservation of threatened species, population control and river and sea pollution. Now it is recognised that mankind faces not merely a threat, but an actual worldwide crisis involving all living creatures, all vegetable life, the entire system in which we live. To focus attention on this crisis the United Nations Organization issued two stamps, an 8 cents inscribed in English, for use at the Headquarters in New York, and a 40 centimes stamp, in French, for use in Geneva. Both stamps feature the conference emblem. The first day cover which accompanied these stamps was designed by Hans Erni and featured a human skull symbolising the biologically polluted surroundings of modern living.

Stamps for the campaign against pollution form a relatively new theme, which began two years ago with a set of four 6 c stamps released by the United States. Each stamp featured the world and illustrated a specific aspect of the problem with an appropriate slogan. "Save our Cities" was the caption to a stamp showing skyscrapers, a seagull in flight was shown with the slogan "Save our Air", a wheatfield with "Save our Soil" and a fish with "Save our Water". Other countries have issued stamps drawing attention to species of wild life or plants in danger of extinction.

The latest country to issue stamps in this theme is Rhodesia which produced a series of four stamps on July 17. The stamps, in denominations of 2½ c, 3½ c, 7 c and 13 c, were designed by Clifford Lawton and show a typical city skyline with a factory chimney belching out black smoke. It seems surprising that pollution of this sort should have become a major problem in a country like Rhodesia. It has reached alarming proportions in the highly developed countries of the northern hemisphere. Over such cities as Osaka, Tokyo, New York and Los Angeles tons of dirt fall on each square mile every month. Coastal vessels collide or run aground because navigation lights cannot be seen in daylight, and traffic policemen have to wear respirators to survive in the fume-filled atmosphere. Smog is found near almost all large cities throughout the world, though the smokeless zones in Britain have considerably reduced this problem in recent years. Most of the important lakes and rivers of Europe are dying as a result of pollution by industrial effluent or sewage or both.

A healthy environment is vital to the continued existence of the world, and pollution anywhere contributes to overall deterioration. The problem is of such proportions that citizens in all walks of life must be made aware of it and must take an active interest in the ecology of their country. Postage stamps are playing an important part in creating an awareness of the problem, and of the need to prevent pollution in all its forms.





EXPOSING TRAINS

By R. Barton

IMAGINE pulsating blue monsters galloping along, or streamlined eels darting through the wind. Make you feel like grabbing for your camera? Well, those monsters and eels are a good description of trains, offering infinite scope for the photographer. And it's not only the trains that offer this scope, for railway architecture—stations and signal boxes—as well as railway staff, have a character all of their own.

Next time you're at a station, take a second look at what you see, preferably through a camera. Observe the passengers impatiently waiting for their trains, piles of boxes and crates of many shapes and sizes, porters pushing or driving barrows and trolleys around. The photographic scope of the rush hour alone at a main terminus could fill a book. When taking photographs primarily on stations, which can be quite dark, it is a good idea to get a fast film of, say, ASA 400 which will eliminate the need for using very slow speeds.

Getting back to the main concern of this article, which is photographing trains, an ordinary film like ASA 125 will be sufficient. All photographs with this article were taken at that rating, using a cheap, though reliable, Cosmic 35, costing around £6. No special equipment or lenses were used. For the usual, "straight" pictures of trains it is advisable to set the camera shutter speed to a fast setting, say 1/250th sec., otherwise the final picture will appear blurred. Always consider a train, as I have already described, as an eel, and get the whole train in the viewfinder. Too many beginners just get the locomotive in the picture, cutting the rest of the train off, and consequently making the picture lose its flow. The best train pictures are taken from a vantage point higher than track level, like a cutting or an overbridge. Anything that will make the photograph more interesting, for example a signal or a platelayer, should be included in the picture.

Many people, myself included, like to take photographs using special effects. Many of these are quite simple, using no specialised equipment. In fact, all you need apart from a camera is an "eye" for good photographs. The thing that attracts many people to the railways is the speed of the fast express trains, and it is quite easy to convey the feeling of speed on to a photograph. One way is to set the shutter to a slow speed, perhaps 1/15th or 1/30th sec. and shoot the train as normal. This will make the train appear blurred, though the background will remain in focus. More spectacular effects can be obtained by keeping the camera on a slow speed and "panning" it with the train. This will make the background blurred, as it is when viewed from a fast train, and though the train will also be slightly blurred, it will stand out and give a sort of 3-D effect. Yet another way is to use usual shutter settings and combine the train with something that indicates speed; like the 100 m.p.h. speed restriction sign shown. Or you can shoot from varying angles, perhaps tilting the camera off "square"—anything that gives a view different from the way most people see it. But above all, use your own ideas, experiment, there is a lot of opportunity for that too on the railways.

Railway photography is certainly an exciting hobby, and though no one is very far from one, it gives the opportunity to travel around as well. It is certainly different, too, from family groups or holiday snaps where the subject is usually standing perfectly still. Unless you press the shutter release at exactly the right time you may find that the train you are trying to photograph is twenty miles down the line!

I have traversed embankments, clambered up cuttings, braved snow, wind, rain and bitter cold to photograph trains—and it's thoroughly enjoyable! Perhaps you will find it so.

Top, this photograph suggests speed, though it is not the train that shows. It is photographed through a 100 m.p.h. speed restriction sign.

Above, by panning the camera with the train, set at 1/30th sec., this picture shows speed at a glance. The overhead power lines above, and the railway lines below, help to emphasise the speed.

Left, anything that makes a picture more interesting should be included in the photograph.

Right, this is a "straight" picture of a train. Apart from the fact that the train looks as though it is standing still, all other aspects of the photograph are correct.

Electric Amphibian

A working land/sea vehicle by A. James

FULL-SIZE PLANS OVERLEAF

BUILT primarily as a toy for a younger cousin, the freelance amphibian drawn and described here proved to be such a successful little model that its building time (two days) and modest expense were completely worthwhile. It is about 13 in. long, 6 in. beam and has an all up weight of under 1 lb. including batteries. I built the prototype from one $\frac{1}{8}$ in. × 3 in. sheet of balsa, one sheet $\frac{1}{16}$ in. × 3 in. and a few odd scraps of $\frac{3}{32}$ in. sheet and brass tube, etc. The motor is an Orbit 505 and the wheels $1\frac{9}{16}$ in. Graupner model aircraft wheels of the balloon variety. An earlier attempt at an amphibian jeep (mentioned later) showed that rear wheel drive was useless for a craft of this sort, so F.W.D. had to be the thing. Due to the transmission system this is not really a raw beginner's model, but at the same time, there is nothing tricky about it—it's just a question of lining everything up accurately. Anyway, enough of this preamble; you'll want to get cracking on your amphibian so let's make a start.

Construction

First cut the two sides from $\frac{1}{8}$ in. sheet and the floor, 12 × $5\frac{3}{4}$ in., from $\frac{1}{16}$ in. (two pieces butted to make up the width). The floor cut-outs are $1\frac{3}{4}$ × $4\frac{1}{2}$ in. each side, starting about $3\frac{1}{4}$ in. from the bow end. Also cut the bow and transom, $5\frac{3}{4}$ in. wide, depth as on plan. Assemble these units into a box, pinning till the cement dries. Cut the inner sides, wheel arch linings, and stern pieces, and cement in place, followed by B1. Add $\frac{1}{16}$ in. bottoms to battery wells and $\frac{1}{8}$ × $\frac{1}{4}$ in. reinforcement at base of bow-piece and inside side top edges.

Two pieces of 12 g. wire or brass tube are fitted with soldered tinplate tags and bolted in place as shown; the front axle bearings (14 g. tube) are soldered to these. Slip the axle in place, not forgetting to position the 40-tooth worm wheel. Cut a $\frac{1}{2}$ in. diameter hole in the hull floor to ensure adequate clearance for the neoprene tube coupling; this hole is framed with a square of $\frac{3}{16}$ in. sq. balsa to which is cemented a thin ply plate which forms the upper shaft bearing. The lower bearing is a washer soldered to a cross-wire, in turn soldered to the front axle bush supports. The bearings must be adjusted to ensure meshing of the worm and wormwheel, and the motor must also be positioned accurately to line up its shaft with the lower shaft. The lower or gear shaft also requires a pinion to engage with the propeller shaft contrate.

The prop-shaft itself runs in two stubs of brass tube soldered to two inverted shallow V's bent from wire, flat brass strip, or flattened tube. The V of the forward bearing is soldered to the front axle bush supports (its exact position will depend on the contrate gear you are using) and the after bearing to a length of tube forming the rear axle bearing, carried between two ply plates cemented to the inner side pieces.

Add a trim tab to keep the model on a straight course, solder a tinplate propeller in place, and fit the wheels. Now add deck and $\frac{1}{8}$ in. sq. coaming. The "space-bus" type superstructure is reasonably self-explanatory, being simply a box fitting over the coaming, the after part being one piece of celluloid or acetate bent round the end bulkheads. Note that the bottom edges need a slip of $\frac{1}{8}$ × $\frac{1}{16}$ in. to keep them stiff.

Finishing

The model is now given two coats of sanding sealer and tissue covered to waterproof the hull. The colour of the model is best left to the individual. I did mine in red, but olive green with white numbers, etc., would look O.K. (D.U.K.W. style).

Fit two Bijou torch batteries, one in each well, wired in parallel (3 v.) which is entirely sufficient for normal operation. Six volts consumes too many motors! The model will climb a 1 in 4 slope with an all up weight of 13 oz. Best results are obtained on a 2.4 volt DEAC pack (less weight and more amps.).

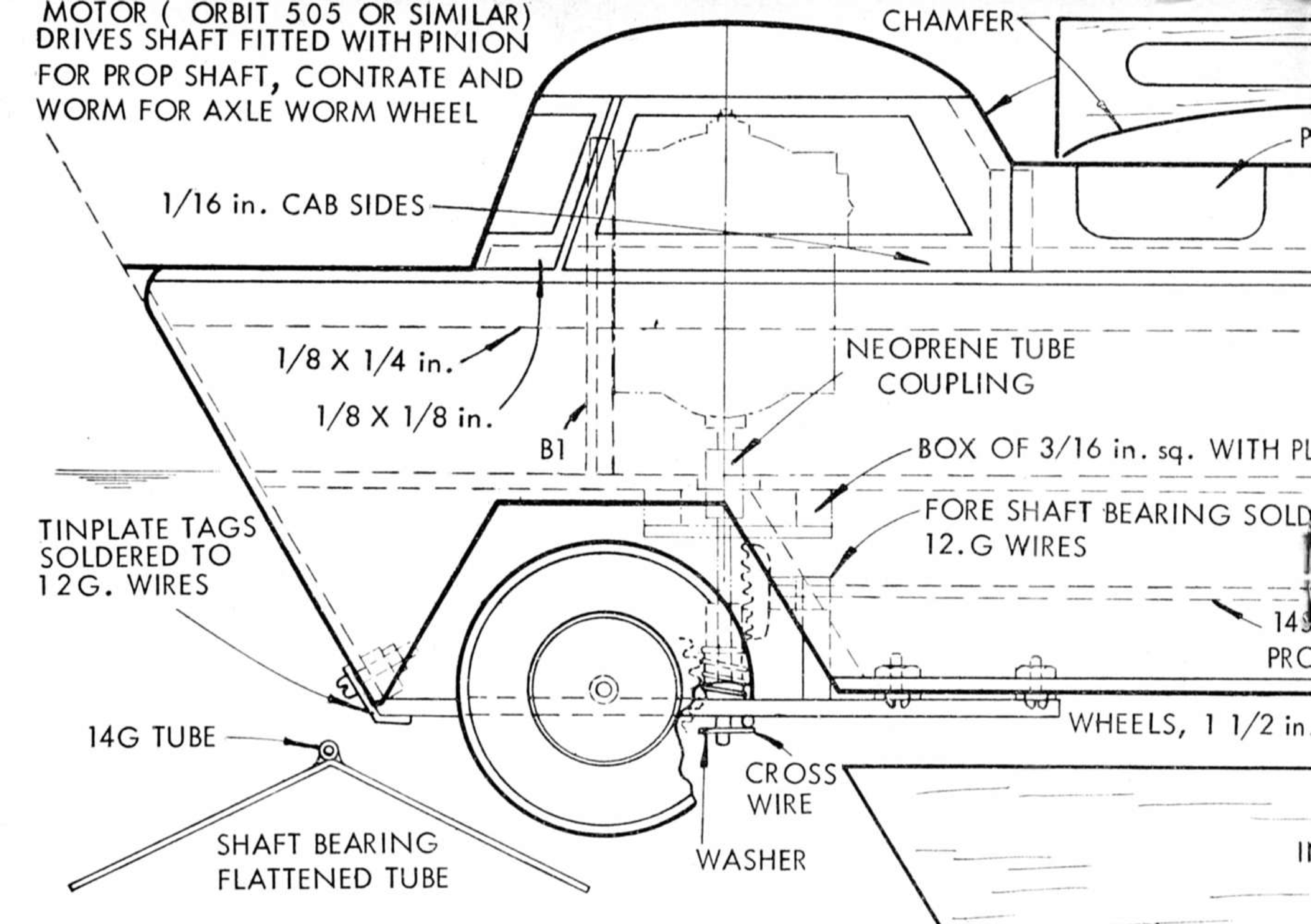
Although the model is not a "Bluebird" and it is very noisy, the performance is, on the whole, not too bad. Its big advantage over a model boat is that it is not forever running aground and getting stuck. The ideal operating ground is in the sandy pools left by the receding tide. Indeed the prototype was made just for these but, as it was REAR wheel drive, it would not come ashore, the front wheels sticking in the mud, leaving the rear wheels spinning still afloat. Remember, if used in salt water, to wash it off in fresh water after use, and keep the metal parts well oiled or greased.

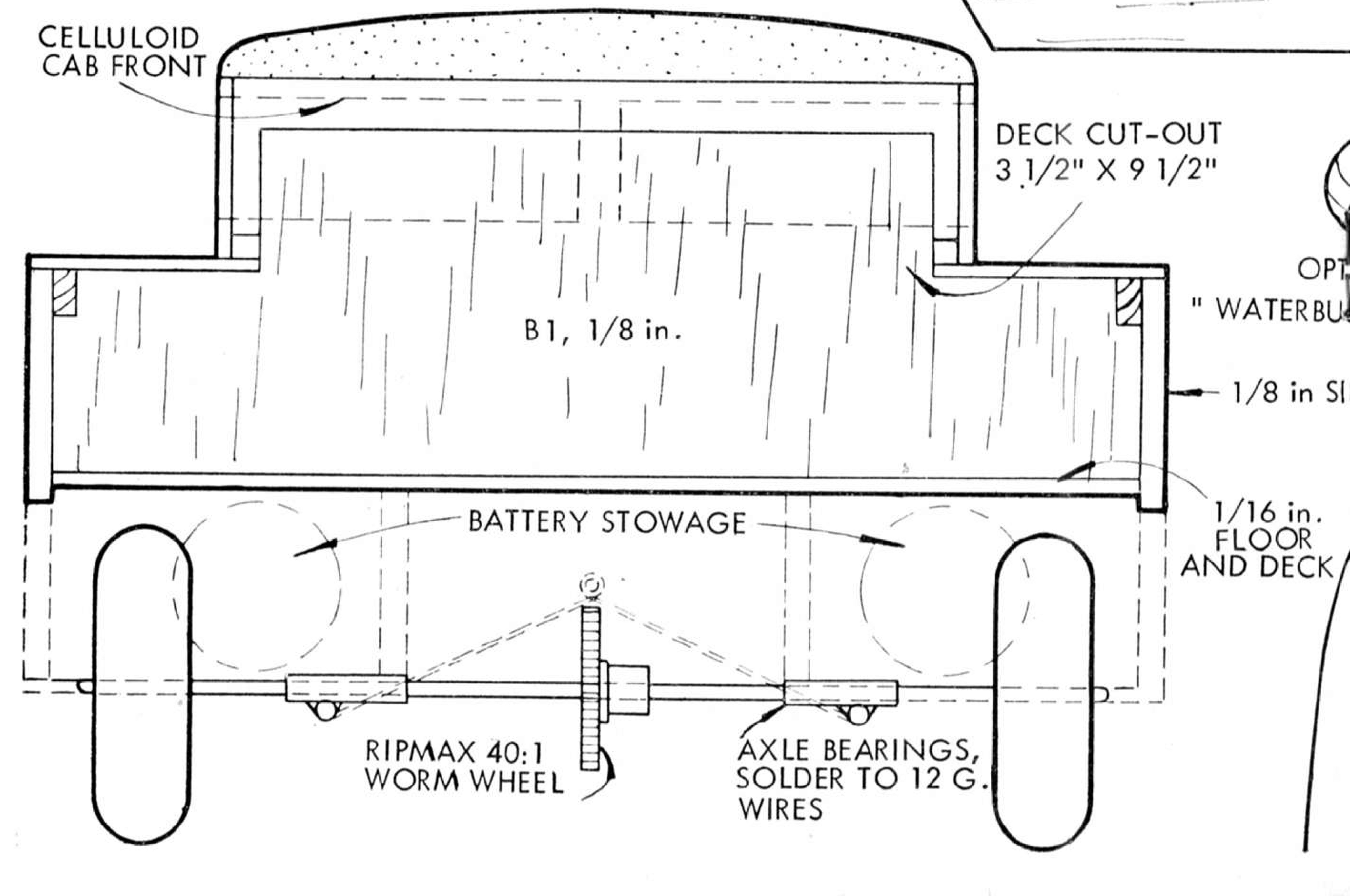
New Meccano Exhibition

A Meccano and Model Railway Exhibition will take place at Henley-on-Thames Town Hall, on Saturday, September 2nd, 1972. The Exhibition will be open all day, from at least 10 a.m. until 6 p.m. and possibly later. All Meccano model makers are invited to take part and display their work—the stage and 100 feet of tabling must be covered! It is hoped that members of the Midlands Meccano Guild, Holy Trinity, and Stevenage Meccano Clubs will also take this opportunity to publicise the Meccano hobby.

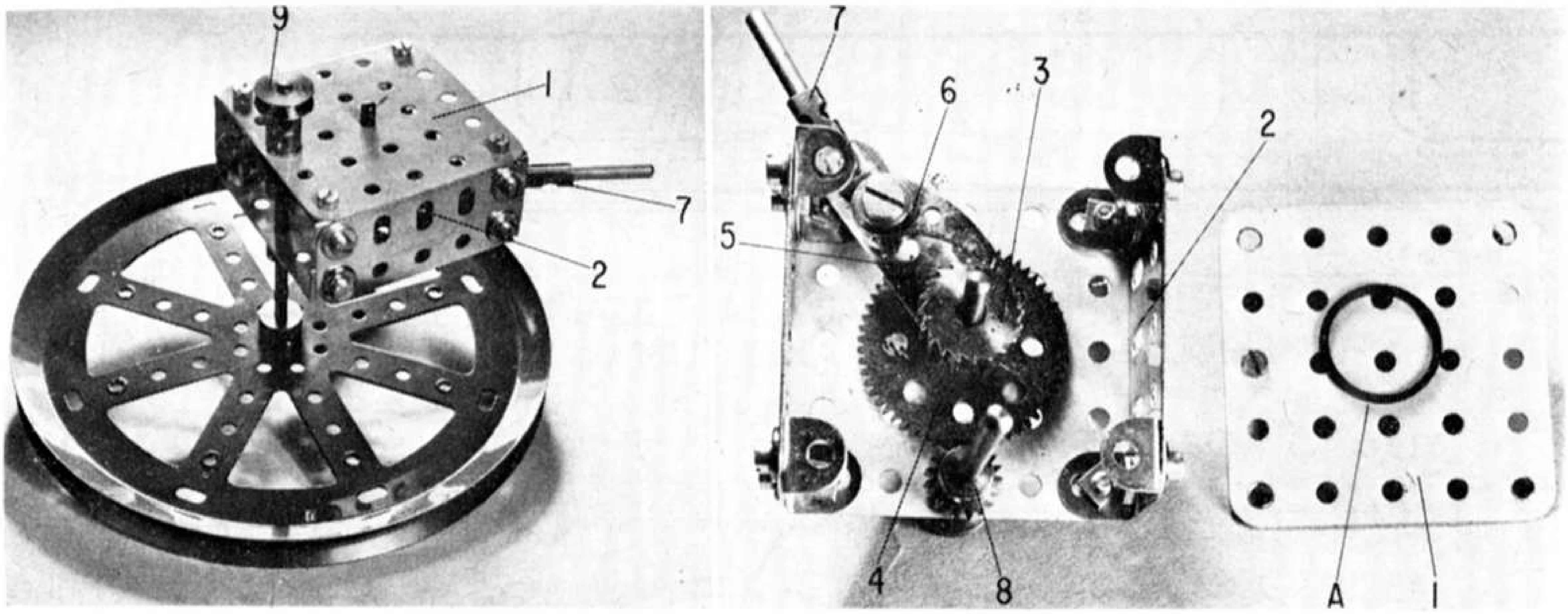
To help provide a balance, and make for a real family occasion, several large model railway layouts in OO and N gauges will be in operation, British Rail will be showing films, and there will be static displays of vintage and veteran Hornby Trains and Dinky Toys. Meccano boys (and Meccano girls!) of 16 or under are invited to submit a model with a "Space" theme in a competition with Meccano as prizes. Those enthusiasts over the age of 16 who like to build to a theme are invited to model a "record-breaking" subject of any type, this will not a be competition unless there is a demand for it—and a volunteer to judge it! A small charge (adults 10p, children 5p) for admission to the hall will be made in order to cover expenses, but all those bringing a model will be admitted free of charge!

The organizers may be contacted at M.W. Models, 165 Reading Road, Henley-on-Thames, Oxon, RG9 1DP. Telephone: Henley (049 12) 3342.


MOTOR (ORBIT 505 OR SIMILAR) DRIVES SHAFT FITTED WITH PINION FOR PROP SHAFT, CONTRATE AND WORM FOR AXLE WORM WHEEL
CHAMFER
P
1/16 in. CAB SIDES
1/8 X 1/4 in.
1/8 X 1/8 in.
B1
NEOPRENE TUBE COUPLING
BOX OF 3/16 in. sq. WITH PL
FORE SHAFT BEARING SOLD
12.G WIRES
14
PRO
TINPLATE TAGS SOLDERED TO 12G. WIRES
WHEELS, 1 1/2 in.
14G TUBE
CROSS WIRE
WASHER
SHAFT BEARING FLATTENED TUBE
IN


CELLULOID CAB FRONT
DECK CUT-OUT 3 1/2" X 9 1/2"
OPT
" WATERBU
B1, 1/8 in.
1/8 in SI
1/16 in. FLOOR AND DECK
BATTERY STOWAGE
RIPMAX 40:1 WORM WHEEL
AXLE BEARINGS, SOLDER TO 12 G. WIRES

CAB REAR 1/8 in.
PAINT WINDOWS
CELLULOID
SIMPLE PROTOTYPE SIDES EXTEND THIS FAR
REAR SHAFT BEARING SOLDERED TO AXLE TUBE
LY PLATE
ERED TO
.W.G.
OP SHAFT
TINPLATE TAB
. OR 40 m.m. SORBO
TINPLATE PROPELLER
NNER SIDES 1/8 in.
SHAPE OF 1/16 in. FLOOR
CUT OUTS BATTERY WELLS
1/8 X 1/8 in.
FRONT AXLE BUSH SUPPORTS 12 S.W.G. WIRE
IONAL
S " TOP
CROSS WIRE
IDES
1/8" SIDES
1/16 in. FLOORS
PLY BEARING PLATES
1/8 in. SHEET
CAB ROOF. SOFT BLOCK
12 G. WIRE SOLDERED TO TINPLATE TAGS
INNER SIDES



Several interesting uses can be found for this Ratchet Motor, designed by Alan Wright of Statham, Lymm, Cheshire. In the view on the right, one of the sideplates has been removed to show the internal gearing. Note that the Driving Band (A) has also been removed from the Pawl for the photograph.

Among the Model-Builders

with 'Spanner'

The Pleasure of Experimentation

If asked what he "gets" from his hobby, the average Meccano modeller will probably opt in his answer for the undeniable pleasure obtained during the building of his chosen model and the incomparable feeling of accomplishment when that model stands before him, finished and successfully operating.

This answer, of course, would be perfectly correct, but I venture to suggest that it would not be the whole story. As any experienced modeller will confirm, the Meccano hobby offers more than just straightforward model-building: it offers challenge, it offers absorbing relaxation, but, particularly interesting to my mind, it offers the pleasure of experimentation—tinkering about and following up sometimes vague ideas, rather than reproducing specific structures or movements from plans, pictures or prototypes. It is surprising how often giving free rein to the creative imagination in this way can result in some very interesting models and mechanisms.

From my association with Meccano over the years, I have developed a theory that such "tinkering", with no pre-conceived end product in mind, tends to result in a reversal of normal model-building habits, particularly when mechanisms are involved. Under normal circumstances, the modeller constructs a mechanism to perform a specific job, or in other words, he knows what the mechanism is intended to do when he starts to build it. It is my theory, however, that, when tinkering, he is quite likely to first build a mechanism and then have to find a suitable use to which his creation can be put—thus reversing normal procedure. Searching for a suitable use can be challenging and absorbing, and finding a use—or several uses—can be deeply satisfying.

Ratchet Motor

I suspect that our first constructional item here was the result of experimentation of this type. It comes from 14-year old Alan Wright of Statham, Lymm, Cheshire and is, in effect, a Ratchet Motor, although Alan himself did not give it a name, leaving it up to us to find something suitable. The operation principle is really quite simple, and yet remarkably effective. When a handle, controlling a ratchet mechanism, is pulled, it imparts movement to the Rod carrying the Ratchet Wheel. This movement is transferred through simple step-up gearing to a second Rod from which the output drive is taken, a flywheel also being mounted on this Rod to increase over-run.

The unit illustrated is copied from Alan's original plans and consists of a framework built up from two 2½ × 2½ in. Flat Plates 1 connected together by two 2½ in. Flat Girders 2, attached by Angle Brackets. Journalled in the centre holes of the Flat Plates is a 2 in. Rod on which a Ratchet Wheel 3 and a 57-teeth Gear Wheel 4 are fixed with a freely-moving 2½ in. Strip 5 on the Rod between them. The Rod passes through the lower end hole of the Strip and both the Gear Wheel and the Ratchet Wheel are each spaced from the adjacent Flat Plate by two Washers. Locked in the centre hole of Strip 5 is a Pivot Bolt carrying a Pawl with boss 6 which engages with the Ratchet Wheel, against which it is held by a 2½ in. Driving Band threaded through the centre hole in the Pawl and looped over a Bolt fixed in nearby Flat Plate 1. A Rod and Strip Connector 7, carrying a 1½ in. Rod, is bolted to the top of Strip 5.

Held by Collars in the lowest centre holes of Flat Plates 1 is a 3½ in. Rod, carrying a ½ in. Pinion 8 which meshes with Gear Wheel 4. Each Collar is spaced from its Plate by one Washer, while the Pinion is spaced by two. A ½ in. Pulley 9 is fixed on one end of the Rod for drive take-off purposes and, finally, a 6 in. Pulley is fixed on the other end to serve as the flywheel.

The particularly interesting thing about this mechanism is how, with a little thought, it can be put to a number of different uses. Alan tells me that he first tried it out, without the flywheel, in a go-cart, but with little success as the cart moved only when the lever was pulled. He does say, however, that the unit can be used in stationary models where short bursts of movement are required and I think this is perhaps the best course to follow when using the mechanism as a power unit. It does have a couple of other uses, though, as the Head of Meccano's Model Department pointed out when I mentioned it to him. For instance, by removing the flywheel and reversing the positions of Gear Wheel 4 and Pinion 8 to give a step-down ratio, it can be used as a Ratchet Jack—the type of unit which is used for dragging heavy objects and pulling tree stumps out of the ground (the jack is anchored to a fixed point and the ratchet used to wind in a cable attached to the load). The use which really appeals to me, however, is as a game. By taking the mechanism as described, mounting it in a suitable support and fitting a cardboard disc to the face of the flywheel, you have a first-class "fun machine". The card disc should be marked off into segments and a fixed pointer added. When the operating handle is pulled, the disc spins and, when it stops, the segment opposite the pointer denotes the winner.

As I have been writing the previous paragraph, the thought has just struck me that the segments on the card could be numbered, then the machine could be used in place of the throwing dice with board games such as Monopoly, Ludo, etc. This, I must finally add, illustrates what I was talking about earlier, namely the fun of finding uses for "unplanned" constructions.

PARTS REQUIRED

1—6	1—19c	18—37b	1—147b
8—12	1—23a	10—38	1—148
1—16	1—26	1—38d	2—72
1—17	1—27a	3—59	2—103f
1—18a	18—37a	1—147a	1—186
			1—212

Simplicity Model

Next, I would like to draw attention to the delightful simplicity model Oil Lamp featured here. This also was submitted by Alan Wright, although it is actually the work of Alan's sister Elizabeth. Now a young lady of 16, Elizabeth designed the model when she was eleven and I think all will agree that its obvious realism proves a remarkable talent in an 11 year-old! It consists of nothing more complicated than two ¾ in. Contrate Wheels 1, fixed with teeth interlocking on a 1½ in. Rod secured in the boss of a 1 in. Pulley 2, and yet it certainly captures the air of one of the old-fashioned oil lamps which were widely used for illumination until the introduction of electricity. Note how the Pulley Grub Screw has been replaced by a standard Bolt to represent the wick control wheel. An excellent little model, Miss Wright!

PARTS REQUIRED

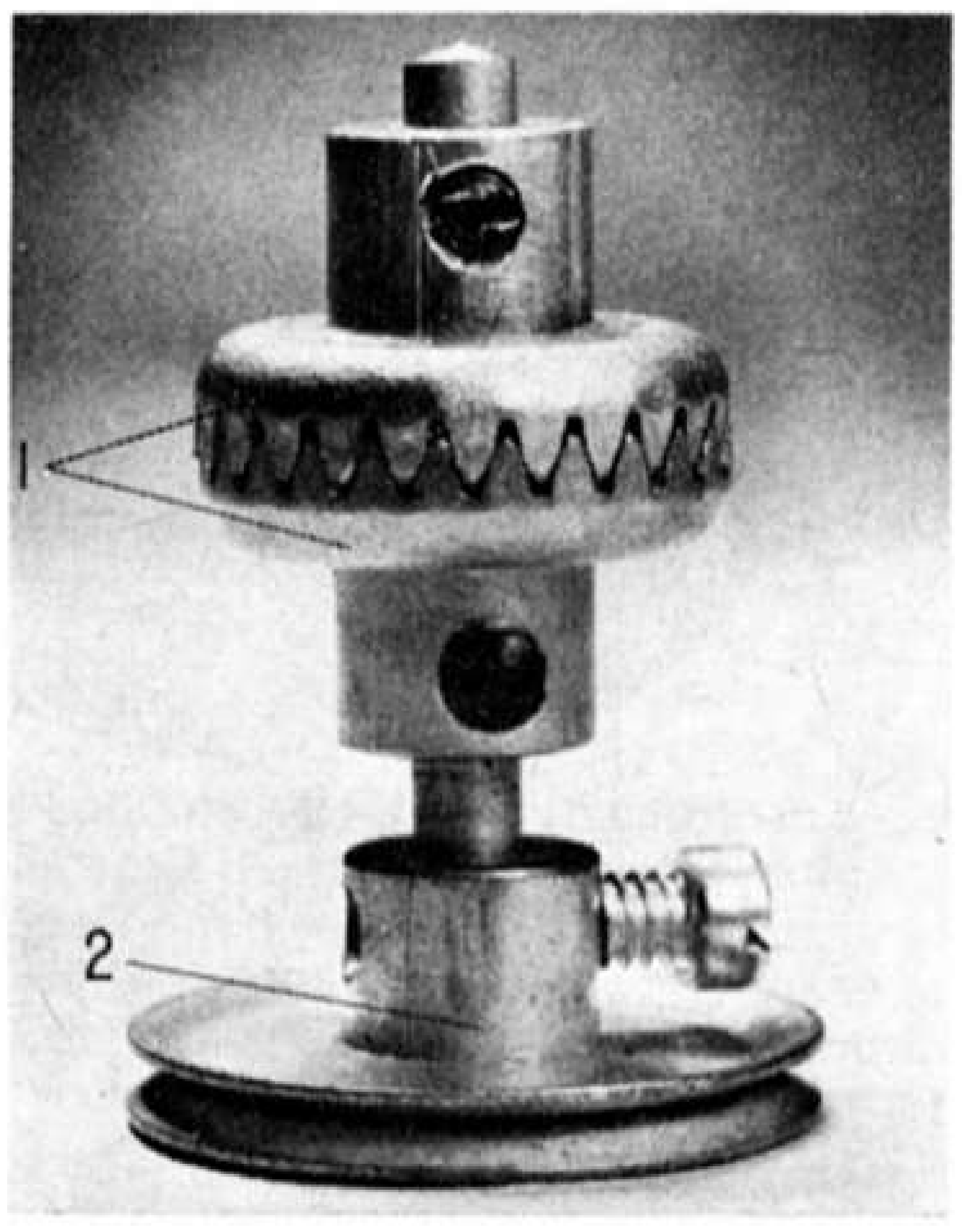
1—18a	1—22	2—29	1—37b

Plastic and Metal Hints

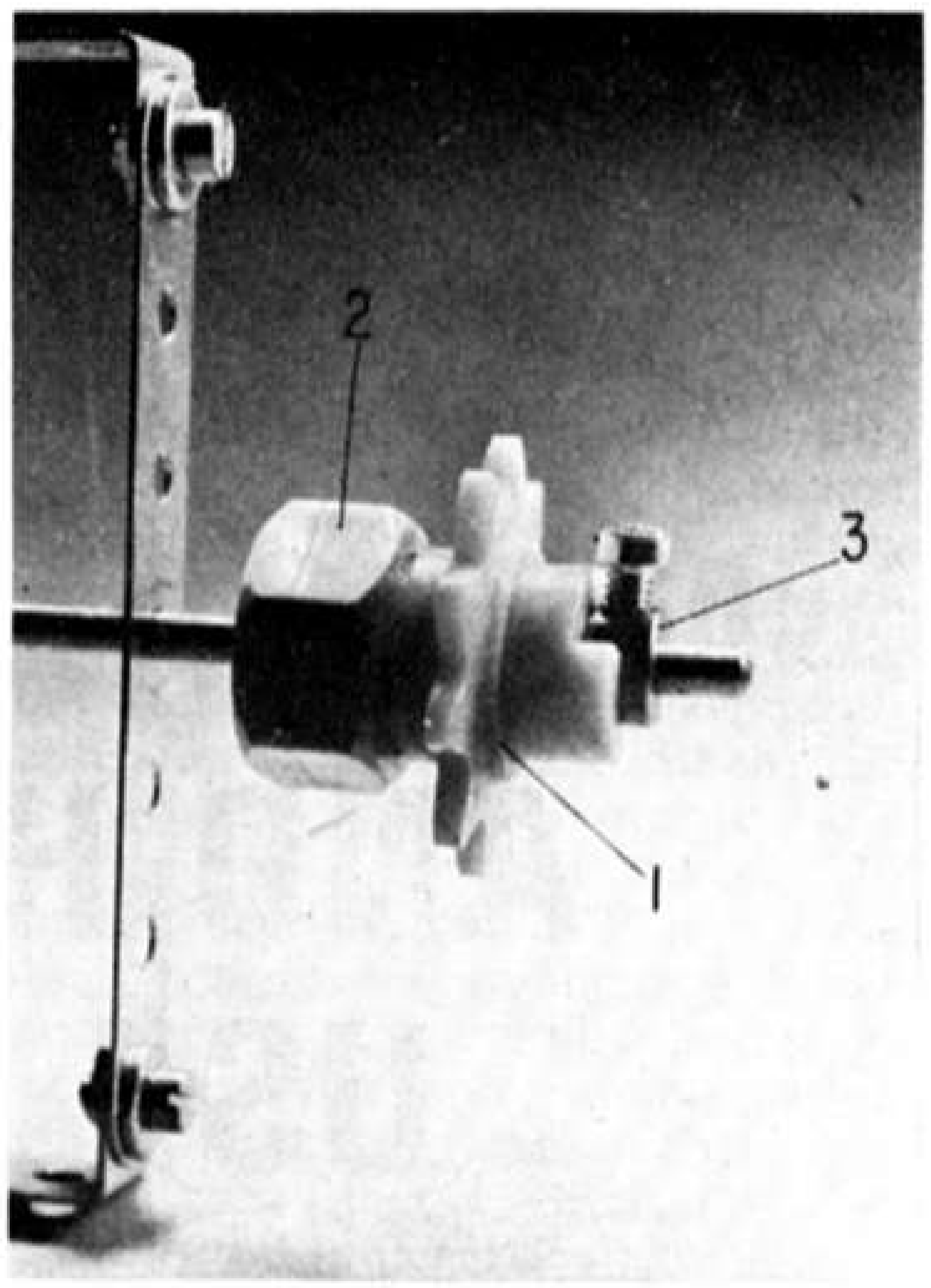
We now have a pair of very useful hints for those modellers who, on occasion, make use of a combination of Plastic Meccano and metal Meccano in their models. The first is a money-saving idea applied to the Caterpillar Track Pack when it is used with metal models. As readers will know, the Track Links contained in the Pack run on Plastic Meccano Sprocket Wheels which are themselves designed to fit onto the large-diameter Rods included in the Plastic Meccano system. If the track is required to be used with standard Meccano Rods, therefore, Couplings must first be fixed on the Rods so that the Plastic Meccano Sprockets can in turn be fixed to these. Being brass, however, Couplings are expensive items. The current U.K. retail price of a single unit is 21p, therefore a way of reducing cost is desirable and this is precisely what the first idea does. Instead of a Coupling, it uses two Collars, thus reducing cost by almost half as the Collars currently sell at 6p each.

The idea is really quite simple. A Collar (hidden in the illustration) is first fixed inside the threaded section of the Plastic Meccano Sprocket 1 by the Sprocket's Collet Nut 2 in the normal way. The assembly is next positioned upon its supporting Rod, then a second Collar 3 is *fixed* on the Rod inside the other end of the Sprocket in such a position that the fixing Screw in this Collar engages with the dog clutch section of the Sprocket boss. Thus, when the Rod revolves, the protruding Screw causes the Sprocket to turn also. To obtain the best results, Collar 3

(*continued on page* 438)

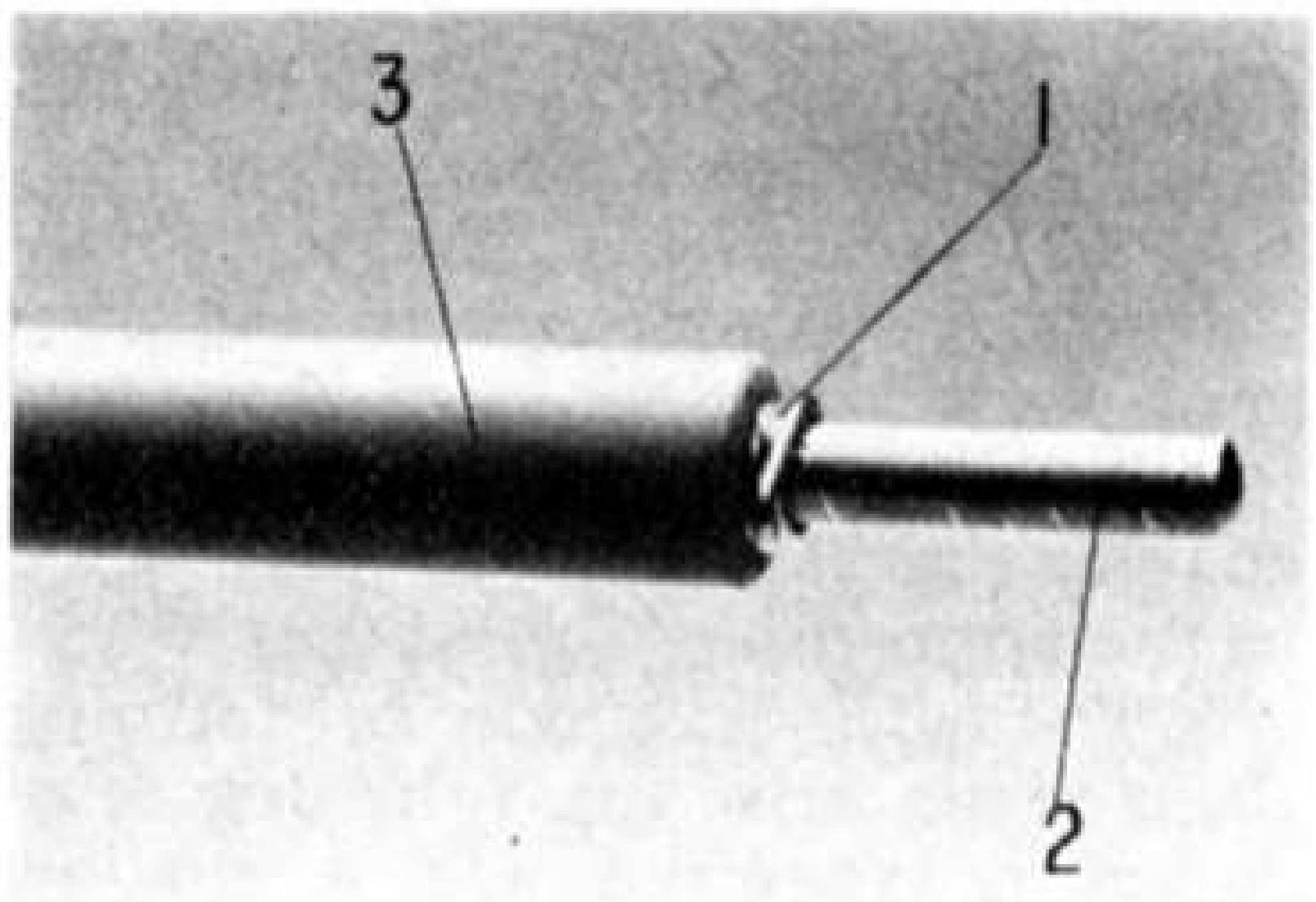


The "simplicity" model Oil Lamp which was built by Miss Elizabeth Wright when she was 11 years-old.



This picture illustrates a method of fixing a Plastic Meccano Sprocket Wheel to a "metal" Meccano Rod using Collars instead of a Coupling. Under operating conditions, the assembly would of course be mounted against the supporting framework.

Below, a simple, but effective way of fixing a Plastic Meccano Axle onto a "metal" Meccano Rod.



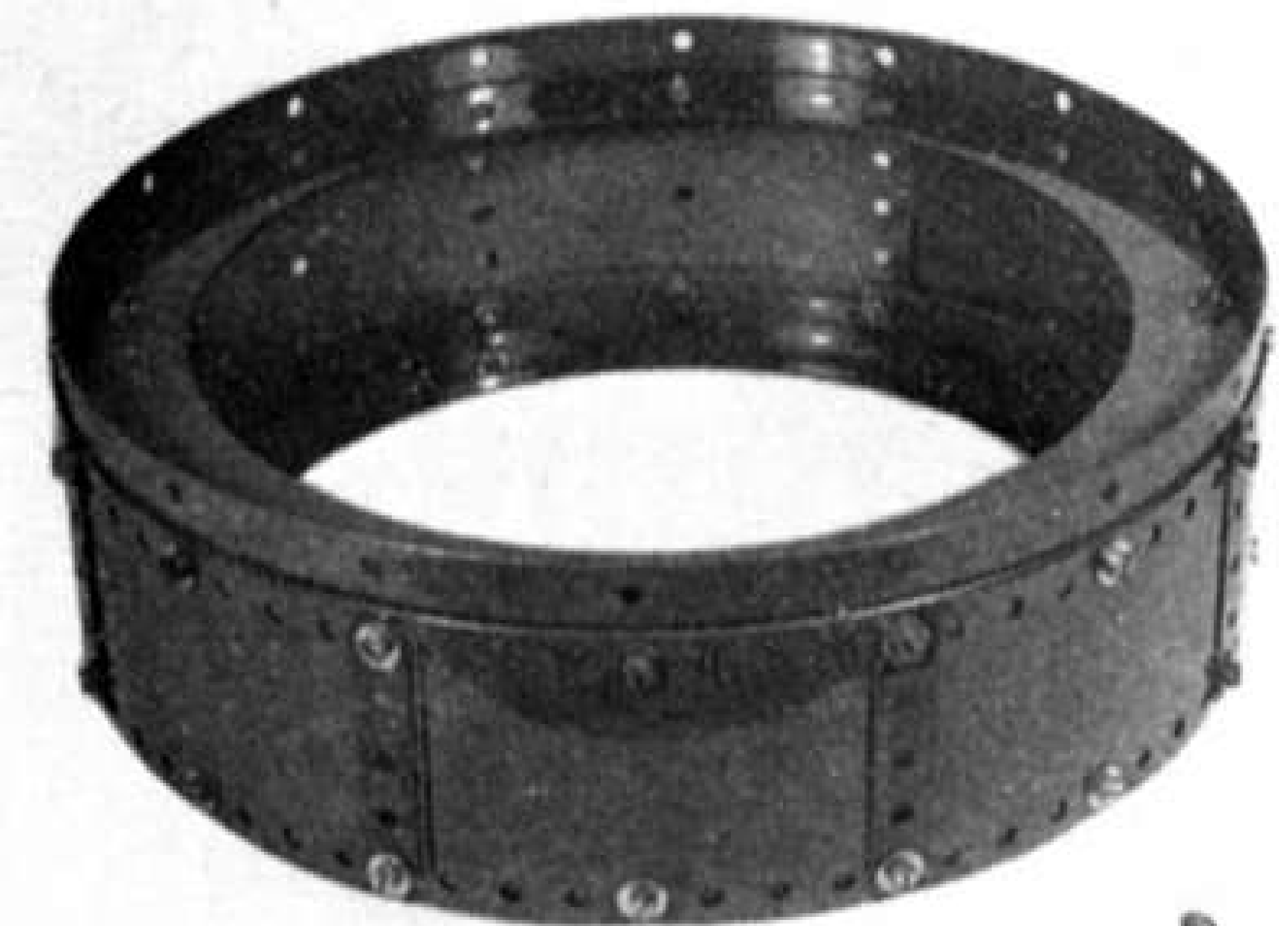


FIG.1

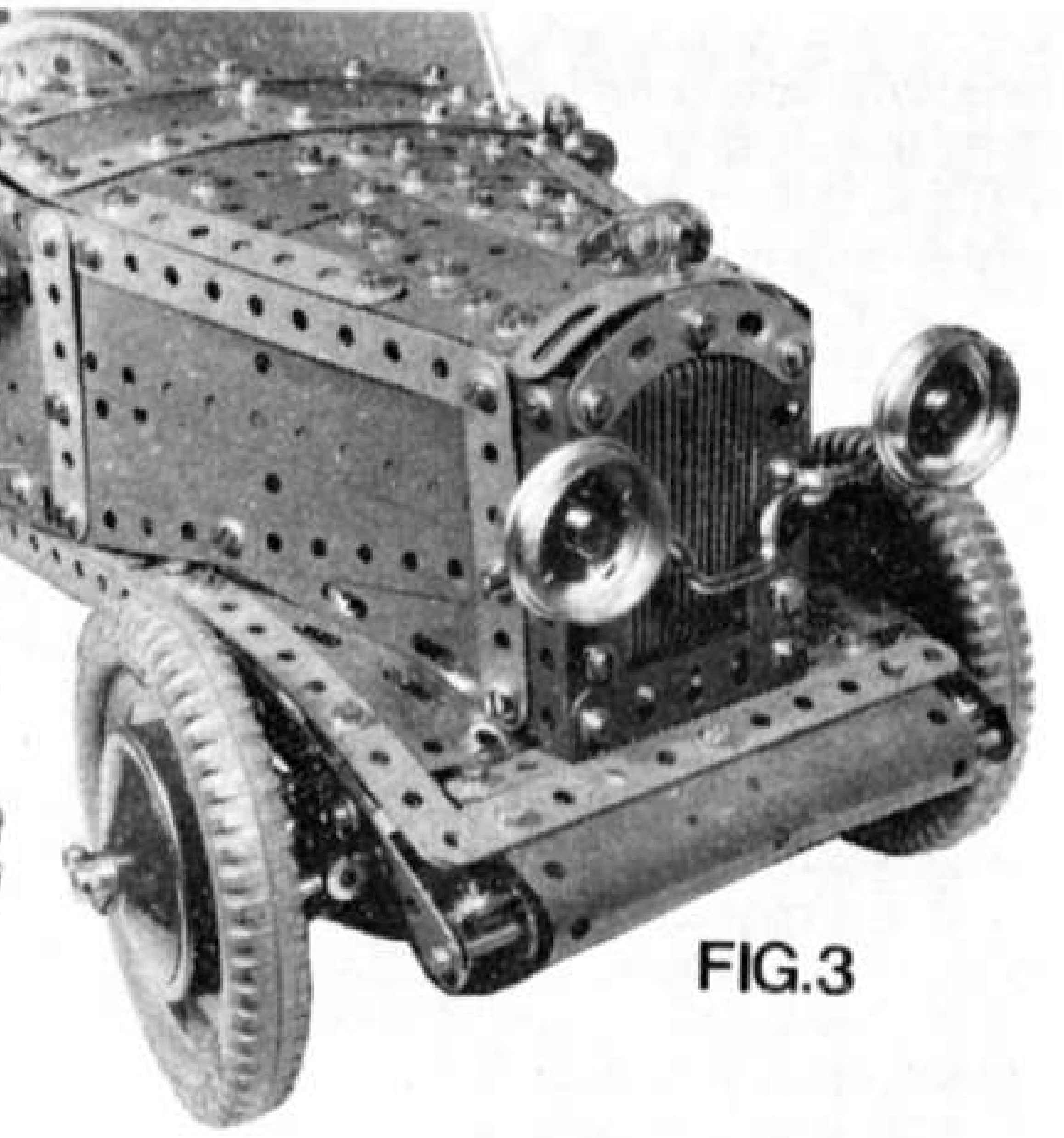


FIG.3

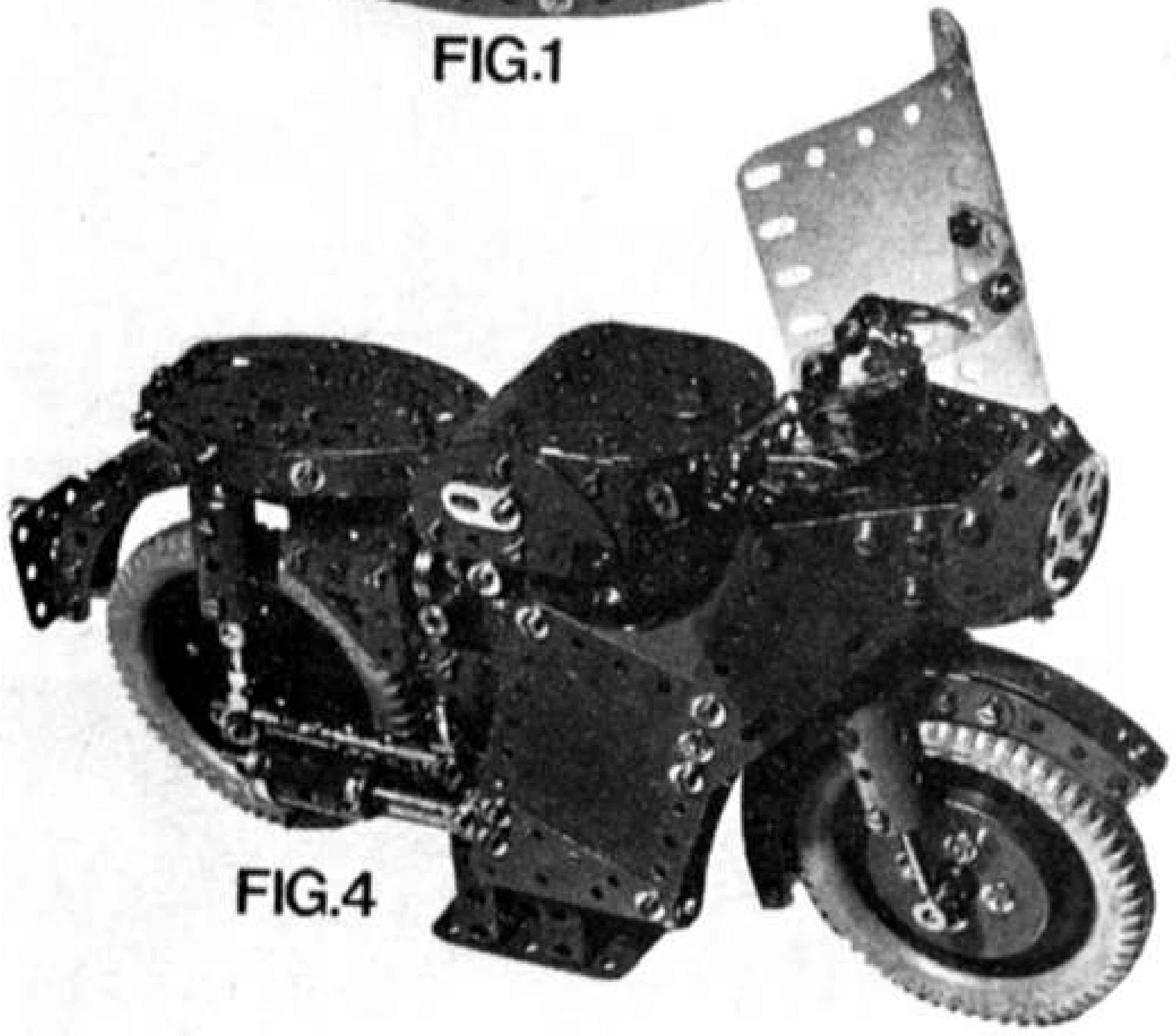


FIG.4

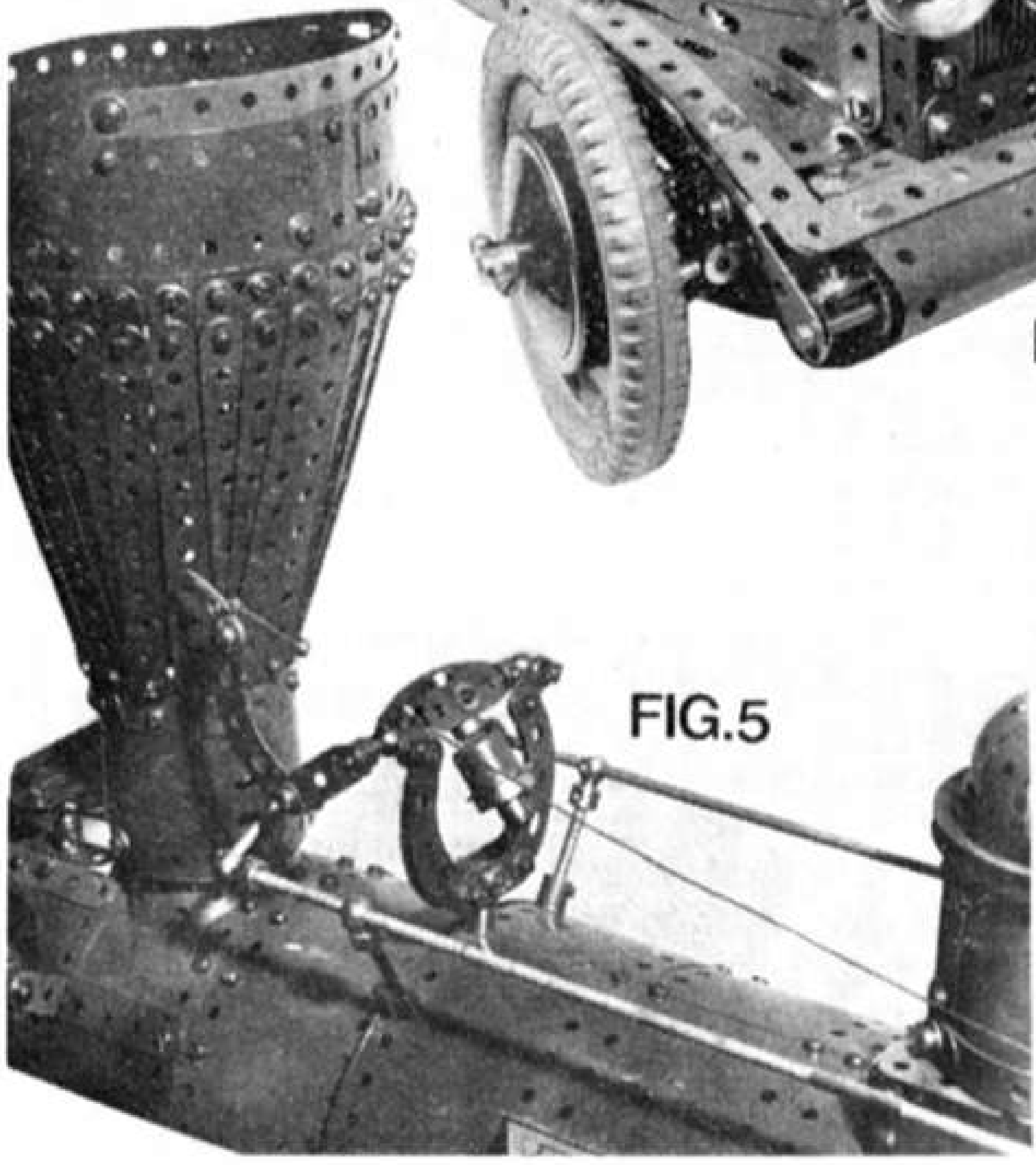


FIG.5

Fig. 1. Flexible Plates provide a rigid curved wall which supports Flanged Rings to make a very strong drum for a roller bearing. Fig. 3. An example of excellent contour moulding on the front bodywork of a vintage sports car. Fig. 4. A modern motor-cycle in Meccano parts with its entire streamlined fairing moulded in Flexible Plates. Fig. 5. Model locomotives are particularly suitable subjects for using flexible plates in boiler and chimney modelling.

MECCANO PARTS AND HOW TO USE THEM

Part 9

By B. N. Love

BASIC construction and motion having been introduced, we may now consider the use of Curved and Flexible Plates to give shape and form in a finished model. Fortunately, the Meccano system has a large range of these parts so that prototype models can be quite readily made to simulate the original in general appearance with considerable fidelity. Flexible and Curved Plates are made in a thinner gauge of sheet steel than that used for the standard rigid plates and this enables the modeller to mould them to the appropriate contour.

Two basic methods of forming these plates arise from the degree of curvature required. If a shallow curve is all that is required, then the Flexible Plate may be attached to the framework of the model starting at the centre of the Plate or perhaps at one end and then, by simply laying the Plate round the framework and securing it at several points, the required curvature is achieved with no damage to the plate. When the model is taken to pieces, the Flexible Plate may be used again for bending to a different shape. Fig. 1 shows this first application, a very simple one in which the same size of Flexible Plate is overlapped round Flanged Rings to form a very strong drum shape to support a built-up roller bearing. In this case, 4½ in. × 2½ in. Flexible Plates, Part No. 193c, are used, each one overlapping its neighbour by one slotted hole which is, in turn, covered by a 2½ in. Perforated Strip. This adds rigidity and neatness but the strength of the drum wall comes from the curvature of the Plates. The construction shown will support the weight of a man standing upon it. In Fig. 2, an even shallower curve is used to form the fairing at the rear of a model vintage car. As well as the rectangular Flexible Plates in the system, Triangular Plates of similar thin gauge metal are available and two of these are shown in the illustration bolted to 2½ in. Square Flexible Plates as an extension of the fairing over the spare wheel platform. In this case the slight curvature required is applied by Perforated Strips above and below the Flexible Plates.

Once the limit of elasticity in a Flexible Plate has been exceeded, it will take up a permanent bend or "set" and such bending is deliberately introduced in a standard part, No. 199 known as a Curved Plate, U-Section. Two of these are illustrated in Fig. 3 which shows the frontal bodywork of the vintage car. Being bent to U-shape form, they make a splendid streamlined nosing between the chassis irons below the radiator. Further use of the Flexible Plate is also evident in the illustration where 5½ in. × 1½ in. Flexible Plates and 3½ in. × 1½ in. Triangular Flexible Plates are combined to mould the bonnet contours with great realism. The upper portion of the bonnet shows a method for utilising several small Flexible Plates and Perforated Strips to produce a taper effect with increasing curvature towards the radiator end. Careful thought, intelligent selection of parts and patient construction can achieve very high standards of neatness and realism.

Fig. 4 shows a splendid example of this in which the entire body fairing of a model motor-cycle is formed from Flexible Plates. One of the special Flexible Plates is known as a Corner Gusset, Part No. 201, or a Flexible Gusset Plate. Two applications of this occur in the motor-cycle model although they are not immediately apparent. One pair is used to form the join in the rider's leg guards at knee height and another pair, bent and joined together by two overlapping holes, trap a 1½ in. Pulley Wheel by its flange or groove to form a neatly moulded headlamp. On a small model like this, very little manipulation is required because only small plates and shallow bends are required. As an addition to the Flexible Plates, Meccano Ltd., introduced Transparent and opaque Plastic Flexible Plates at the end of the 1960's. Two of these are shown in Fig. 4 where a pair of 2½ in. × 2½ in. Transparent Plastic Plates form the windshield. Curvature is given by locking the lower end of the windshield inside the headlamp support fairing. It is true that the upper plate will attempt to flatten itself out but this simply produces an overall conical curvature which enhances the shape of the windshield.

Where long Flexible Plates and perfectly circular bending is required, two methods of achieving this are available. Many of the circular parts already in the system such as Circular Girders, Hub Discs etc. may be used as formers around which long plates may be bolted step by step. A sample of this construction is shown in Fig. 5 where parts of a locomotive boiler are formed from 12½ in. × 2½ in. Strip Plates. When the length of a Flexible Plate is 7½ in. or longer, it is known as a Strip Plate and is made of slightly thicker gauge steel than the other Flexible Plates. This gives them longitudinal thickness with less tendency to twist under load. It also means that they require more effort to bend them.

The advanced constructor who has a sufficient range of parts at his disposal might well consider making a bending machine to produce his curves. An excellent design for this appears on Page 157 of the March 1969 Meccano Magazine where full building instructions for a Plate bender built entirely from Meccano parts are given. Such a bender is capable of producing very smooth and accurate curvature in Meccano Flexible and Strip Plates, the Plates emerging as cylinders with a "set" curvature in them. Readers will have seen Meccano demonstration models in the windows of toy dealers and will have noticed the uniform curvature achieved in many of these standard models developed at Liverpool. One might think that an expensive forming machine is used for these parts so it may come as a surprise to readers to know that a bending machine using Meccano parts and Wooden Rollers, included in the system, has served for many years in the Model Room at Binns Road and is still in daily use.

Of particular interest is the "balloon" chimney stack on the locomotive in Fig. 5 which combines Perforated Strips with Flexible Plates to create the awkward shape of the old American wood burning locomotive chimney. A further locomotive is shown in Fig. 6 which illustrates a combination of Flexible Plates and the cylinders which are already available in the Meccano system, namely, the Boiler, Part No. 162, and the Chimney Adapter, Part No. 164, used with the Sleeve Piece, Part No. 163. These combine with the standard range of Flexible Plates to provide the realistic body contours of a twin boilered monorail steam locomotive, an unusual subject modelled with a high standard of realism and detail. The reader should note that where a Flexible Plate has slotted holes, these are overlaid with Strips or secured by Nuts and Bolts carrying Washers on both sides of the Flexible Plate. The slotted holes provide an excellent range of adjustment but the use of Washers gives a neater and stronger join between plates. In cases where Flexible Plates have been "set" for a special shape by the modeller, it is generally better to keep these for later models rather than attempt to straighten them out. This latter practice often leads to buckling or noticeable distortion.

Fig. 2. Body mouldings of vehicles can be readily modelled using Flexible Plates on a Perforated Strip framework. Fig. 6. An unusual subject in the form of a twin boiler monorail locomotive shows an excellent combination of Flexible Plates and some standard cylindrical parts in the Meccano system.

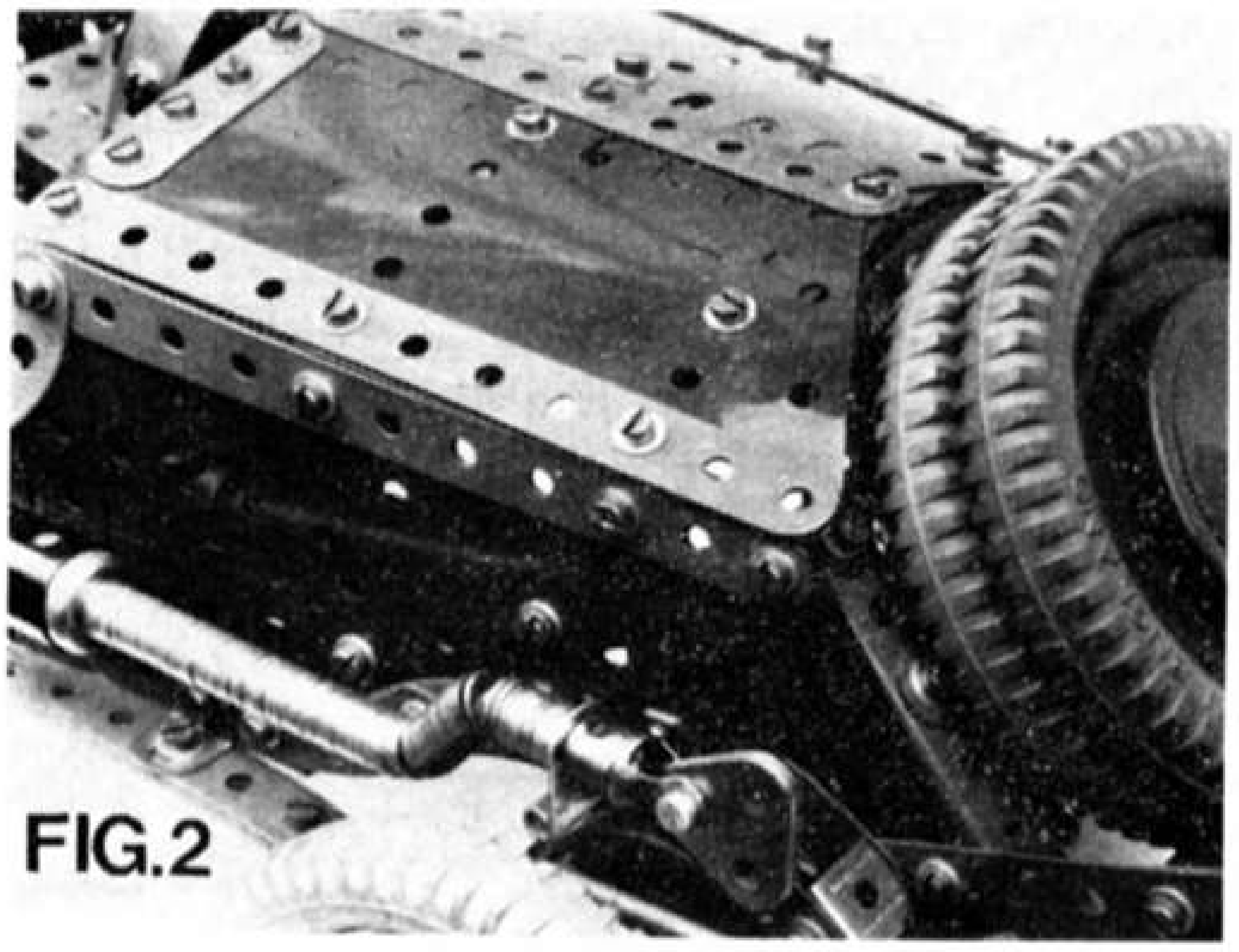


FIG.2

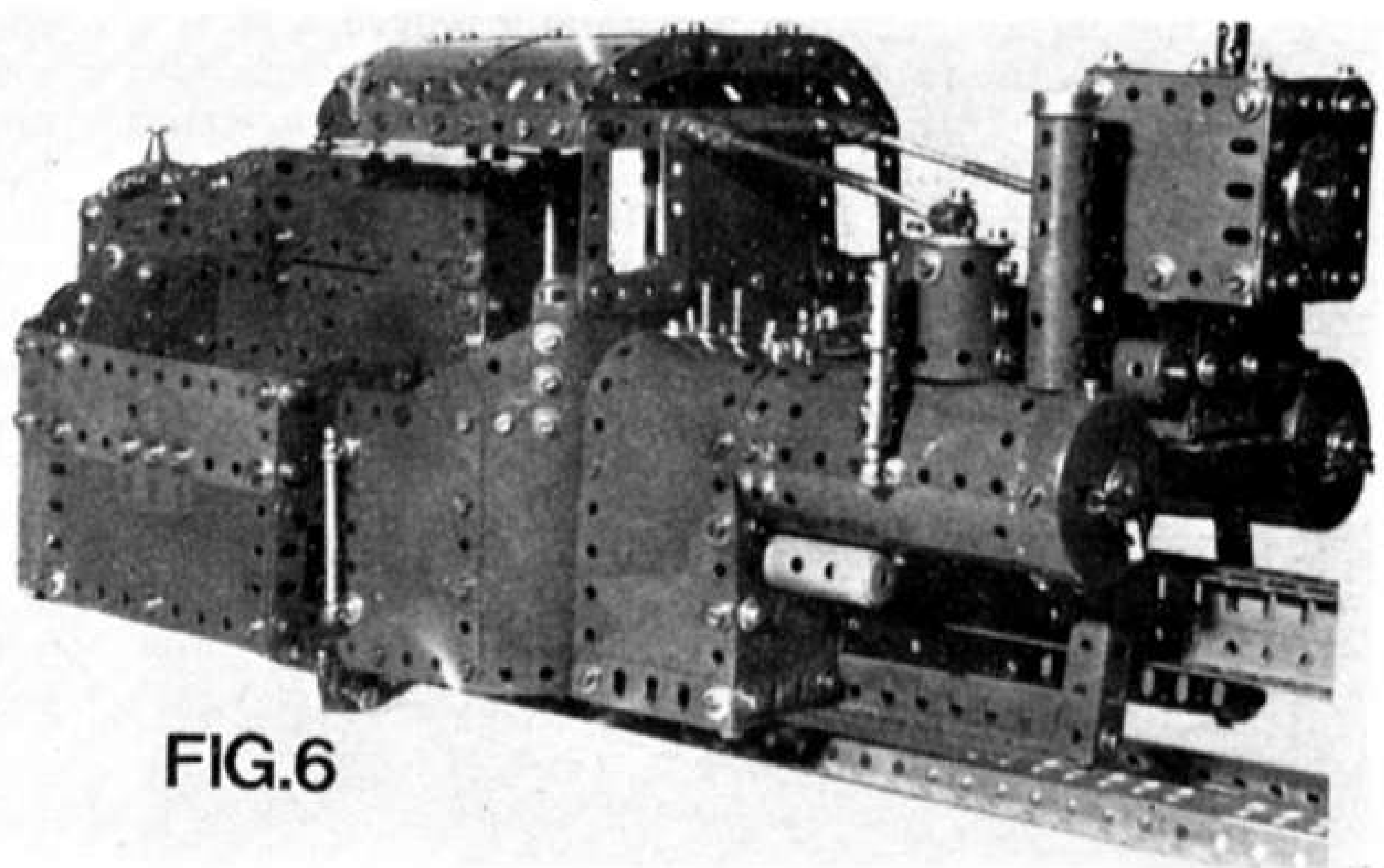
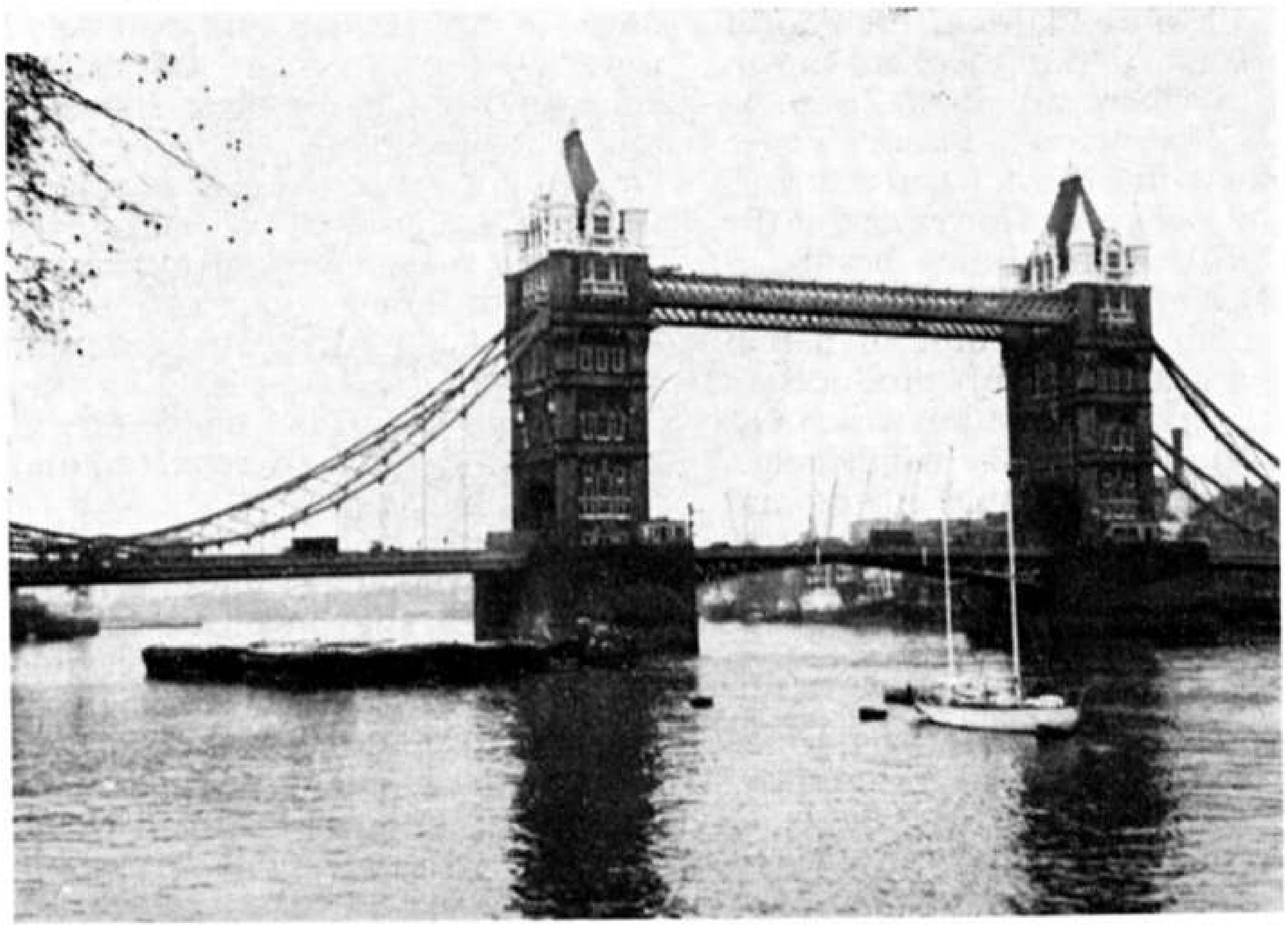


FIG.6



Bridge Design and Construction

PART 8

Early Suspension Bridges

By Terence Wise

SUSPENSION bridges are one of the three basic forms of bridging known to Man from the earliest times, and the principle of suspension bridges can be illustrated equally well by studying the design of the huge Severn bridge or a primitive rope and bamboo bridge erected by tribesmen in Assam. The principle is known to have been in use in China since 400 A.D. but it did not make its way to Europe until towards the end of the 16th century. It was introduced into England in 1741 in the form of a 70 foot span iron bridge over the Tees. It is significant that since 1816 the world's longest bridges have employed the suspension technique, with the exception only of the heyday of the greatest cantilever bridges—the Forth bridge and Quebec bridge, spanning the period 1889 to 1929.

Principle

The suspension principle is basically that a flexible rope or chain, whilst it has no transverse stiffness, can offer a high resistance to a direct pull or tensile stress. A rope can easily be hauled across an opening too wide to be spanned by a beam, and when that rope is made fast securely at both ends it is capable of carrying a suspended load, as in Fig. 1, or several loads as in Fig. 2, or the weight of a continuous load—Fig. 3. With each new distribution of the load the rope will find for itself a new position of equilibrium, falling into a curve referred to as the funicular polygon. When the load is uniformly distributed along the "deck", as in Fig. 3, the figure becomes a parabolic curve. It is a catenary when the rope or chain has nothing but its own weight to carry. (If the funicular polygon was inverted it would become a linear arch, or a line of struts equilibrated under the given load. The line of tension in the curved chain becomes a curved line of pressure in the arch).

A suspension bridge is the lightest form of construction which can carry loads between two points and this in itself is a great advantage. Also, the bridge deck, because it is suspended by vertical rods or wires attached to the suspended chains or cables, can be built without the use of staging, so suspension is often the choice when spanning navigable rivers.

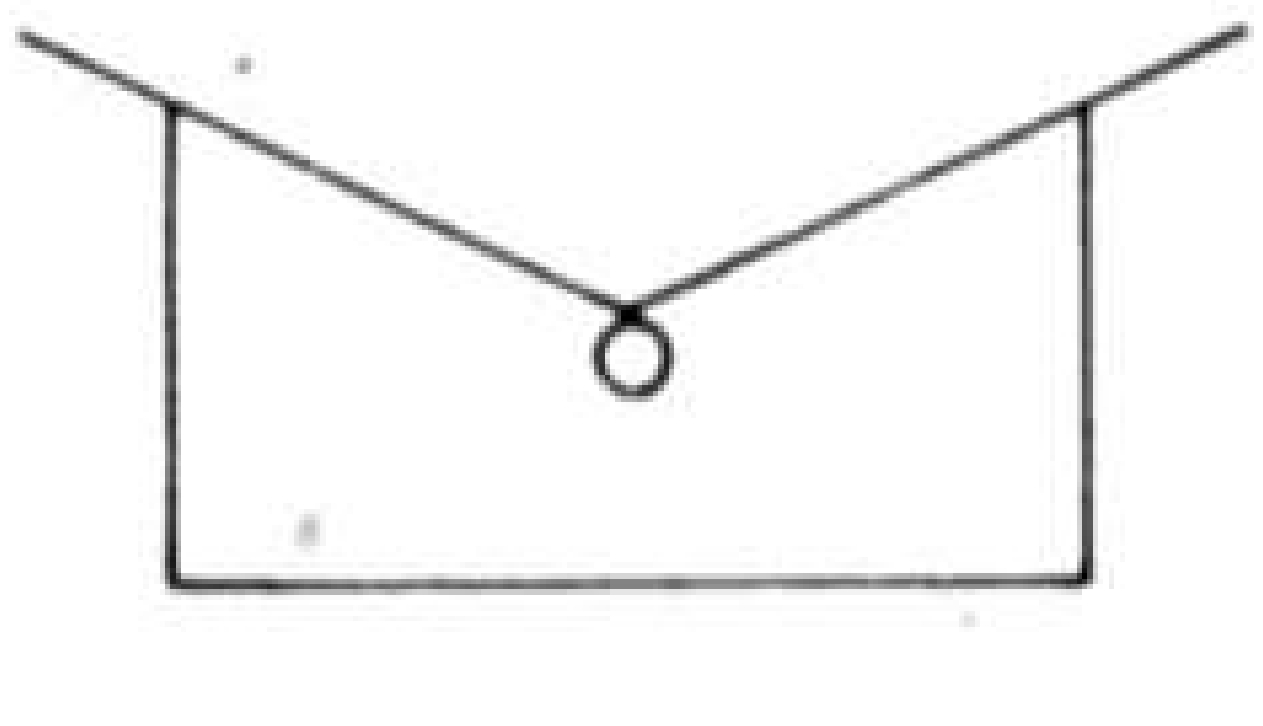
Basic Construction

The basic form of construction is a main span flanked on each side by towers. The chain or cable is laid across the tops of the towers and hangs down between them in a curve which is nearly parabolic. The dip of the chain or cable is not generally more than one twelfth to one sixteenth of the span. From the summit of each tower the chain or cable is then led down to an abutment placed at some distance behind the tower, so that on each side it extends across an opening between tower and abutment. Therefore such a bridge will span three openings, with the deck suspended from the chains or cables across the main span and two side spans.

Menai Straits

An example of this type of bridge is Telford's famous Menai Straits bridge, begun in 1819 and opened in 1826 to link Anglesey to the mainland. The Admiralty were using the channel extensively at that time and required the bridge to have 100 feet headroom, with no obstruction caused by staging during the long construction. A rock near the Anglesey shore, known as Pig Island, provided a base for one tower, and the other was built on the Caernarvon shore. The span of 579 feet between the towers was bridged by a wrought iron chain of flat links invented by a Captain Brown R.N. This consisted of bars ten feet long and 3½ × 1 inch in section, with enlarged ends. Five such bars made up the thickness of the chain, and the bars were then linked together by six plates at each end, the whole

FIG 1



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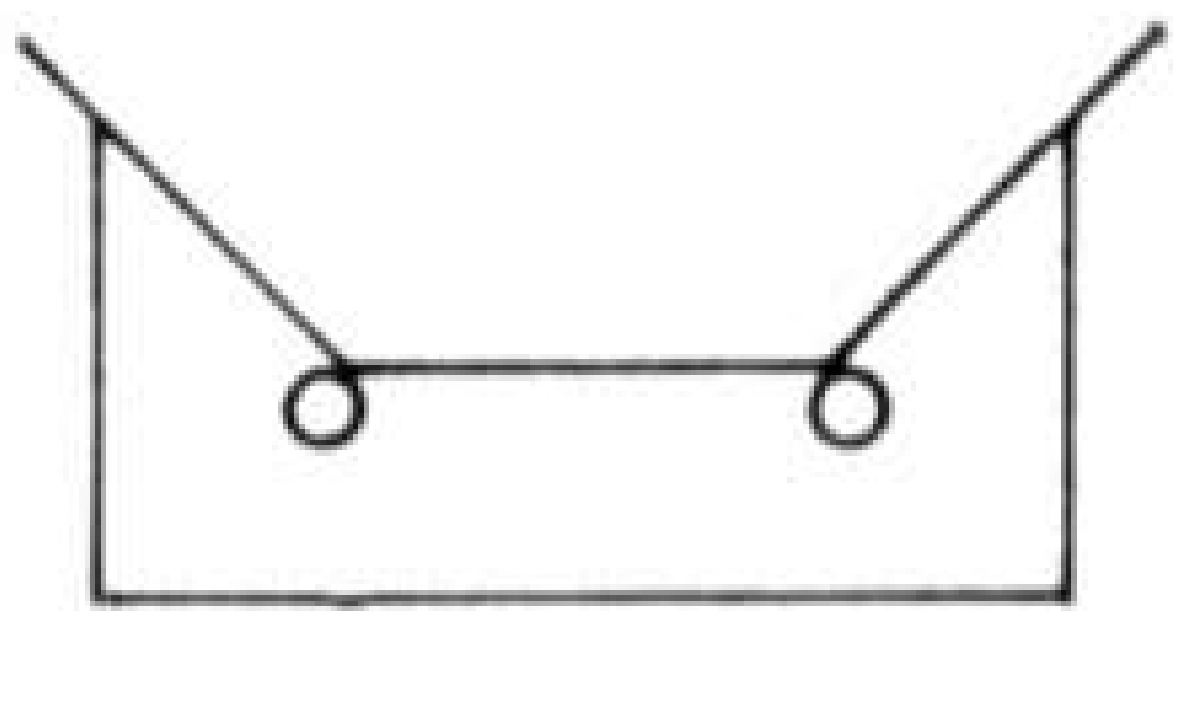

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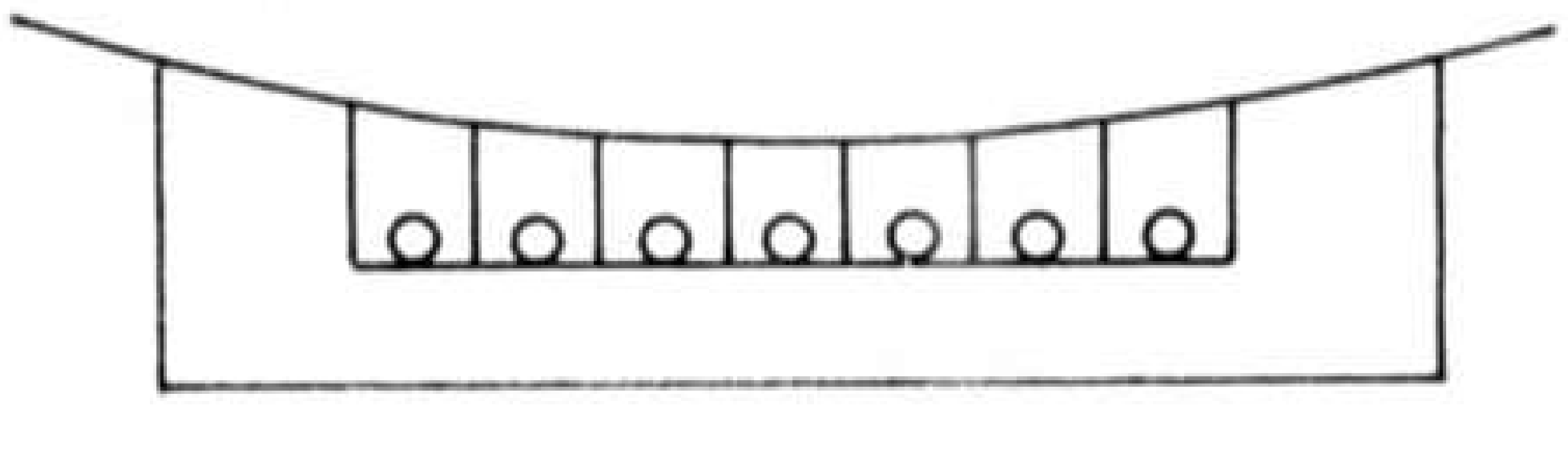
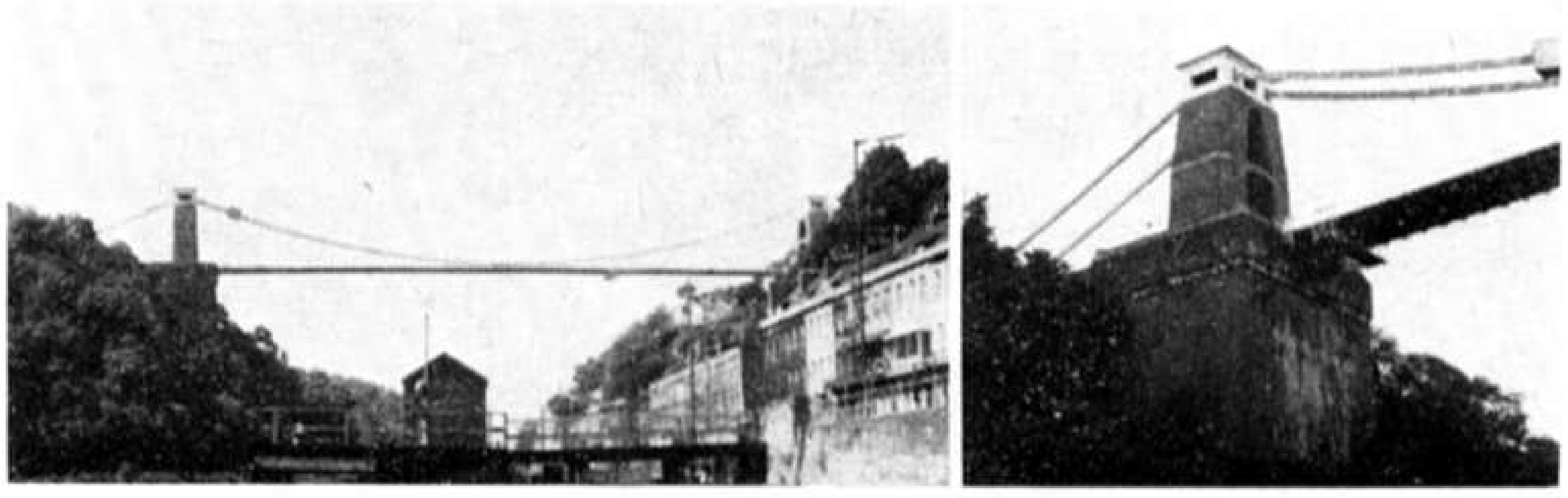




Opposite, Tower Bridge, London, designed by J. W. Barry, assisted by Brunel. The bridge is covered fully in a later article, but note how the side spans, rarely noticed by the casual observer, are in fact of the suspension principle. Right, Brunel's famous suspension bridge at Clifton, over the Avon Gorge. Note the maintenance cradles on both chain and deck. Far right, the western tower of this suspension bridge, which is one of the best-known in the world.

assembly bolted together. Sixteen such chains were used, in four sets of four. They were replaced by new ones of high tensile steel about 1940. The bridge deck was 30 feet wide with two 12 foot carriageways and a six foot footway in the centre, and was carried on suspension rods spaced at five foot intervals. These rods were one inch square in cross section and hung from the chain joints, which were staggered to suit this five foot interval.

The approach viaducts consisted of three arches spanning 52 foot six inches on the Caernarvon side, and four arches of the same size on the Anglesey side. As with most suspension bridges of that period the deck had a tendency to oscillate in strong winds, and the deck had to be strengthened soon after the bridge was opened. The same problem still occurs today and is explained at the end of this article.

Where a single span bridge was needed construction was even simpler, with a tower built at each side of the opening, the suspension cable being carried back beyond these towers to their abutments in an almost straight line. These portions of the cable, which carry no load beyond their own weight, are called backstays. The Clifton suspension bridge is an example of the single span, and here the anchorage for the backstays is obtained by tunnelling into the natural rock. The bridge was completed in 1864 and has a span of 702 feet. Until the building of the Severn Bridge, a hundred years later, it was the largest suspension bridge in Britain.

The Towers

The towers of suspension bridges are designed to act as vertical pillars and the chains or cables need not be fixed to them but may be carried over them on a "saddle" or carriage which is free to travel longitudinally upon the top of the tower. When temperatures rise, the curved cable can therefore take care of any expansion in length by assuming a greater dip. Similarly, the expansion of a straight backstay is allowed for by movement of the saddle upon its rollers. Whether a cable rests on a saddle or is fixed to the top of a flexible tower there is always a tendency when under loading for the cable to move horizontally at the tower top.

Steel Wires

The introduction of mass produced steel in the second half of the 19th century made it possible to build much larger suspension bridges, and the use of steel wires in place of iron chains was mainly brought about by the American engineer J. A. Roebling who developed a method of spinning continuous wire cables as early as 1844, a method which has remained largely unchanged to this day. His finest achievement was the Brooklyn suspension bridge across the East River, connecting New York and Brooklyn, the first of a great series of steel wire suspension bridges in America. Now surpassed by others, in its day Brooklyn bridge was justly famous, with a main span of 1595 feet, a rise above water level of 133 feet, a total length of 5990 feet, and carrying two railway tracks, two roads and a wide footway. The bridge cost 15 million dollars and was built between 1870 and 1883, being completed after the death of Roebling by his son, W. A. Roebling.

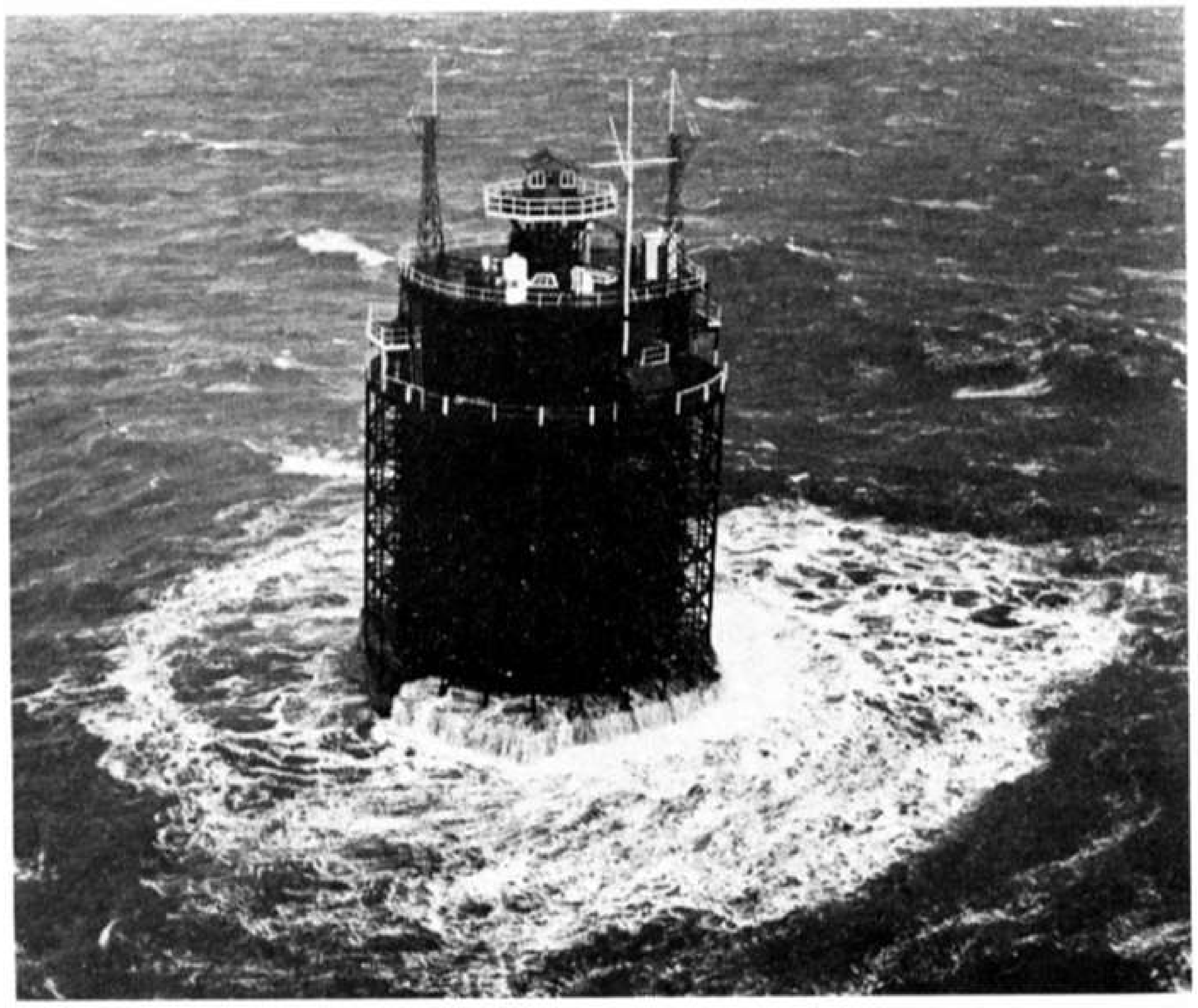
Oscillation

The one big drawback remaining in the design of suspension bridges was the oscillation caused by high winds: in particular this ruled out the possibility of carrying railway tracks—a severe limitation. The problem was countered to a certain extent by the use of horizontal stiffening girders in the deck of the bridge, the girders sometimes being hinged in the centre to avoid temperature stresses. Another step, quite common in America at the turn of the century, was the use of a series of radiating straight ties extending from the top of the towers to a number of points along the deck. This gave some compensation for the flexibility of the chain or cable, a statement which perhaps needs clarifying.

Although the flexibility of the suspension cable is precisely what has given form and existence to the suspension bridge, it is not in itself an essential feature of the design and does not necessarily have to be retained. In suspension bridges flexibility is less harmful, but no more desirable, than in the arch design. So, for example, a suspension bridge can be designed in which the load on the suspension cables and anchorages is eased by making the bridge deck a beam girder to carry part of the load, or by making this beam sufficiently stiff for the cable to be actually anchored to its ends. This latter type of bridge is known as a self anchored suspension bridge.

We will go into this complex question of stiffening more deeply next month, when we cover the more modern suspension bridges and the lessons which were learned the hard way about this type of bridge building.

Chelsea suspension bridge, rebuilt 1935-1937.



Britain's Strangest Lighthouse

By

D. Gunston

TAKE a vast Martian gasometer of latticed steel forty feet across, plant it on a hollow concrete base eighty feet thick, dump the whole into the sea, perch three men and two lights on its top, ninety feet above the waves, give it a catchy name, and there you have Britain's strangest lighthouse, the Nab Tower.

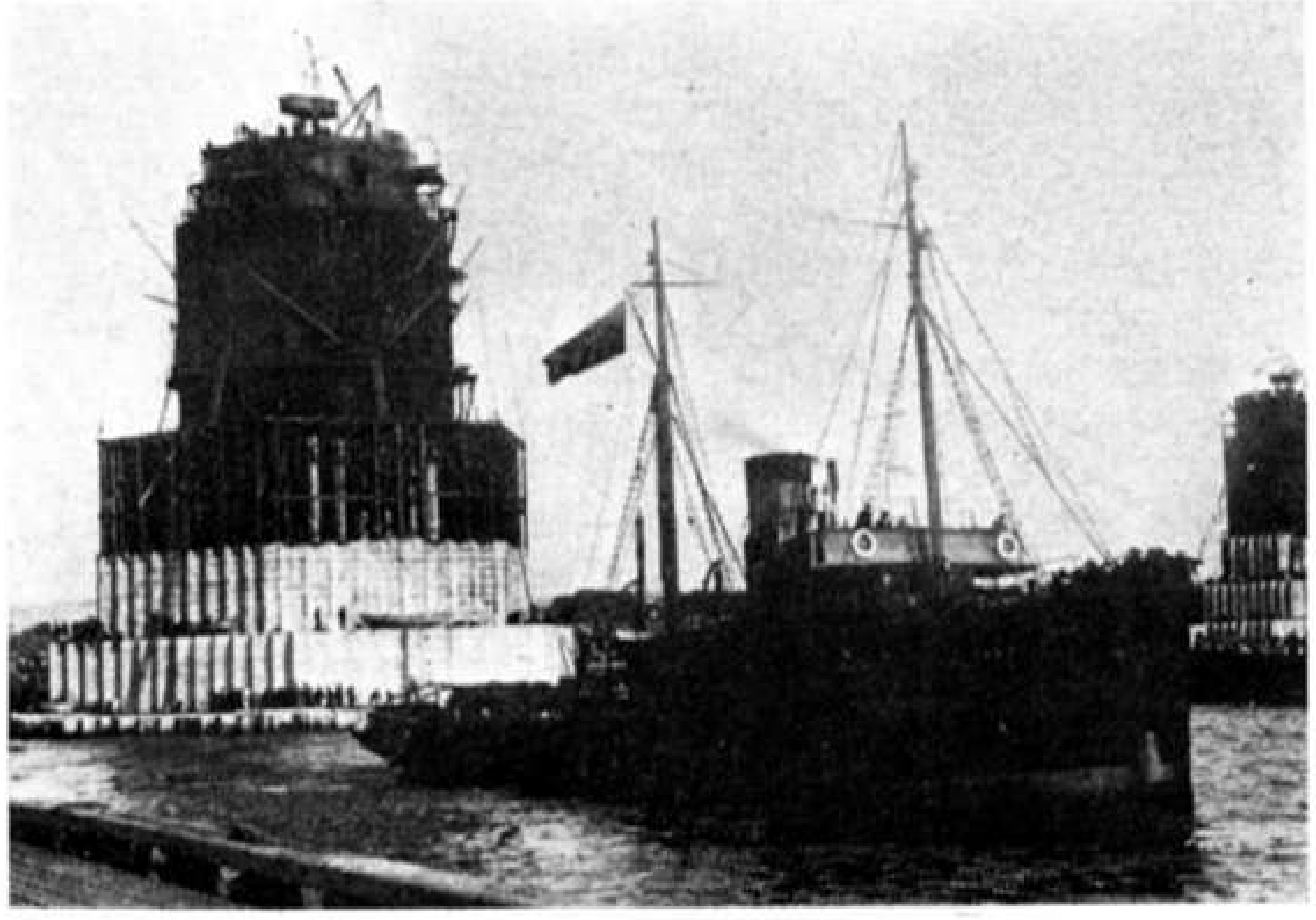
A familiar sight to South Coast holiday-makers, and the first real sight of home for every sailor entering the Spithead channel for Portsmouth or Southampton, this great grey "mystery tower", as it has always been known, is something to arouse wonder.

It is so incongruous, standing there in the middle of the sea, and so conspicuous that you can see its bridal-cake silhouette on the horizon for miles, that it is bound to attract attention.

But as thousands of people ask every year, what exactly *is* it, and just what is all the mystery about?

It seems incredible that anyone should have been crazy enough to build such a huge tower out there—or so it seems, until you discover that no one really intended it to be there at all. And furthermore it was built on land and actually towed there, not built in situ like the better-understood Spithead forts. The mystery of the Nab always deepens until you unearth the story of its strange origin.

In the early months of the last year of World War I, an Admiralty brought closer to despair than people realised by the almost unchecked inroads of German U-boats into our merchant fleet, swiftly decided upon a number of drastic and revolutionary methods of counter-attack. One or two inventive and unorthodox brains were given complete freedom. Most startling was the plan to close the English Channel to all but friendly shipping by sinking a line of six fort-like towers across the Straits (at £1 million apiece) and linking them with steel boom-nets.



The idea looked fool-proof, and within weeks two such towers were laid down in a quiet backwater of Shoreham Harbour, Sussex, bringing sudden and short-lived prosperity and speculation to this tiny Channel seaport. Shoreham was chosen for its seclusion, its nearness to the Channel stream, and its unlimited supplies of shingle for concrete-making.

Nothing like these monstrous edifices had ever been attempted before. They were designed to sink in some 20 fathoms by flooding a hollow base, on top of which a 90 ft. cylindrical steel tower would remain above high water. The civilian designer, Mr. G. Menzies, deserves a measure of immortality for his amazingly successful design, which included making the vast honey-combed concrete bases shaped like a ship, with pointed bows and stern, for easy towing out to the chosen spot at sea.

Some 3,000 non-combatant workmen were rushed down to Shoreham, and soon the towers began to grow. So did the rumours about their purpose, fostered by authorities most anxious to keep the real purpose a secret. "Mystery Towers"—the Press of 1918 had hit upon an epithet that was to cling to one tower over thirty years afterwards. The rumours were even more fantastic than the structures themselves: they were twin grappling-towers to be sunk over wrecked merchantmen to salvage them by the simple expedient of pumping air into both, they were tough mobile forts for engaging submarines in mortal combat out in the Atlantic, they were listening columns for detecting the presence of U-boats lurking on the sea-bed. One school firmly believed they were nothing more romantic than supports for a new bridge at Gravesend!

But Germany's collapse on land came in the November before any rumour could be proved right, and the

Admiralty was left with a couple of singularly expensive and useless white elephants. Only one tower had in fact been completed, and its half-finished partner was broken up again. A naval brainwave decided the fate of the solitary giant: it would be sunk as originally planned, but at the eastern end of the Spithead approaches. There it could replace the old Nab Lightship and serve as a naval defence out-post of immense value into the bargain.

If there were any who doubted whether Menzies' brainchild would ever settle to the bottom of the sea without capsizing (as its prototype model did during the original construction)—and there must have been many—their fears were first magnified and then finally allayed one specially calm day in 1920, when two sturdy steam tugs chugged their gentle course out of Shoreham Harbour with the Mystery Tower floating like a play-raft in tow. The new Nab behaved perfectly and when a stone's throw from the now dwarfed lightship, her great base was opened to the sea, and down she slowly went, tilting rather alarmingly to one side. But no disaster befell the anxious crowd of technical spectators on the top deck, and before long she had settled firmly on the bottom, kept steady on the rocky tip of the Bembridge ledge from the nearby Isle of Wight by the immense volume of water inside the four decks of base.

There she has stood in about twelve fathoms ever since, only once lifting slightly during a winter gale of exceptional force. The one-time U-boat defence had become something almost equally strange, the Mystery Tower had become what every mariner now calls the Nab, in perpetual memory of the not very significant though dangerous Nab Rock a few miles away.

Go right up to the Nab today and its sheer bulk amazes. It stands most incongruously out of the water, very much like a gasometer with its added steel scaffolding, and then the few upper feet of its concrete base are seen, and one realises then that it is not floating. Nowadays, it is a busy and vital hub of shipping assistance, merchant and private yachting as well as naval. When the boat has finally made fast on the landing-stage—and that is a difficult and often impossible task in rough weather—one dizzily ascends the iron monkey-ladder up the outside for eighty feet, and finally steps on to the safety-railed top, dominated by two lofty radio masts, and a perky little glass look-out cabin on a raised platform in the centre. Then on a lower plane of view, the two great turret-like lights catch the eye. Red to north, white to south, their electric beam flashing one second in every ten must have guided countless ships around the rocks into the deep-water channel for Portsmouth and Southampton. The mighty Queens from New York took their turn round the flashing Nab as well as the little dredger from Plymouth Dockyard. In fog a strident warning comes in 2½-second blasts of ear-splitting density from the diaphone fog signal, and if a skipper fails to hear that, there is a massive bell stroke every 7½ seconds.

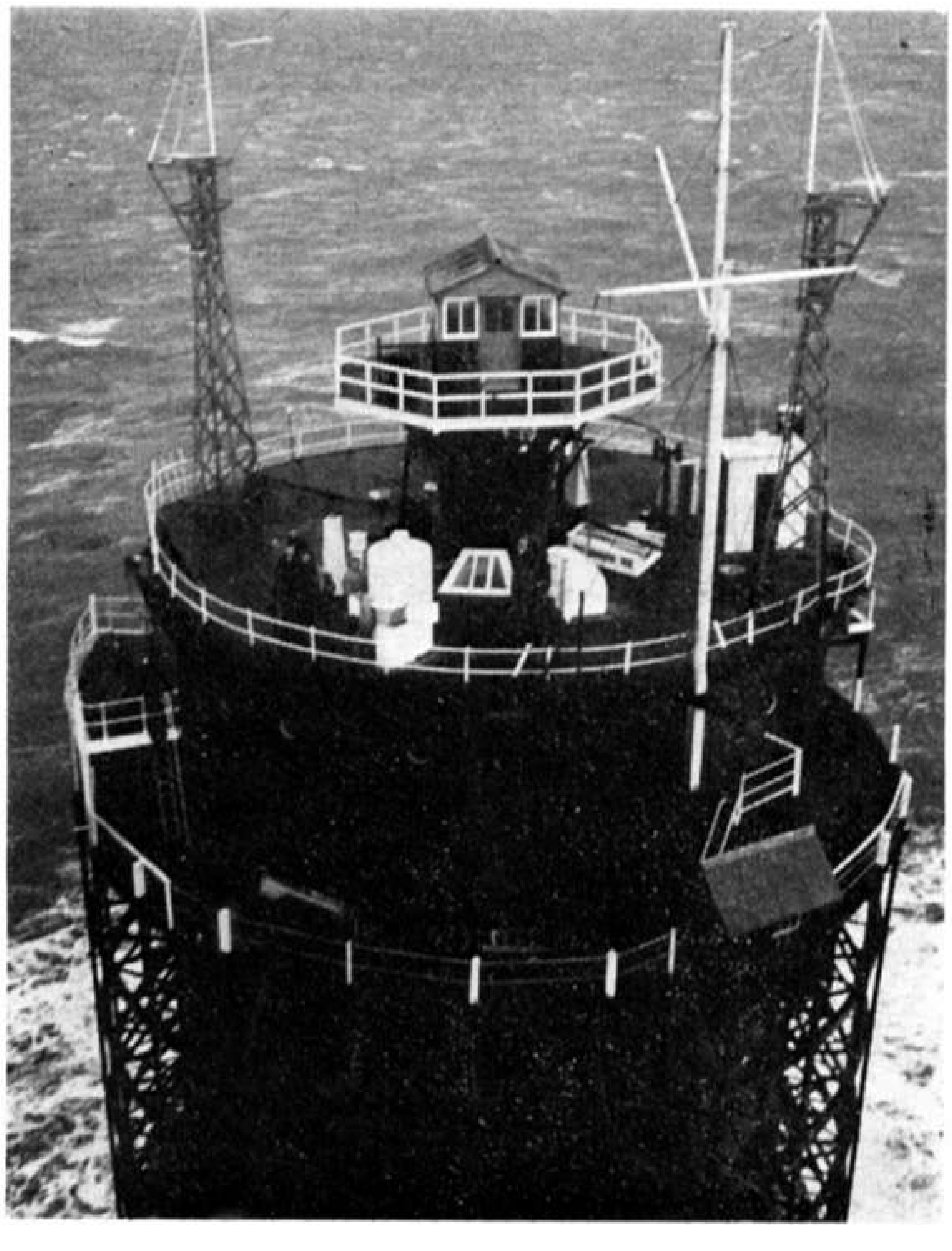
So far, however, save for its invaluable height above the water, the Nab seems little more than a lighthouse. But to that add its present-day uses as radio beacon for giving directional aid to all ships, reporting those in distress and passing on the thousand-and-one messages that make up the daily routine of the navy, a radar experimental station constantly trying out new marine signalling devices, a tidal observation point, a dropping-point for Spithead pilots, and an observation post that can quickly be transformed into an armed fort in an emergency. Deep inside the tower, above the huge diesel generators that produce the electricity, there is accommodation on eight decks for 90 men, though in peacetime its crew numbers but three.

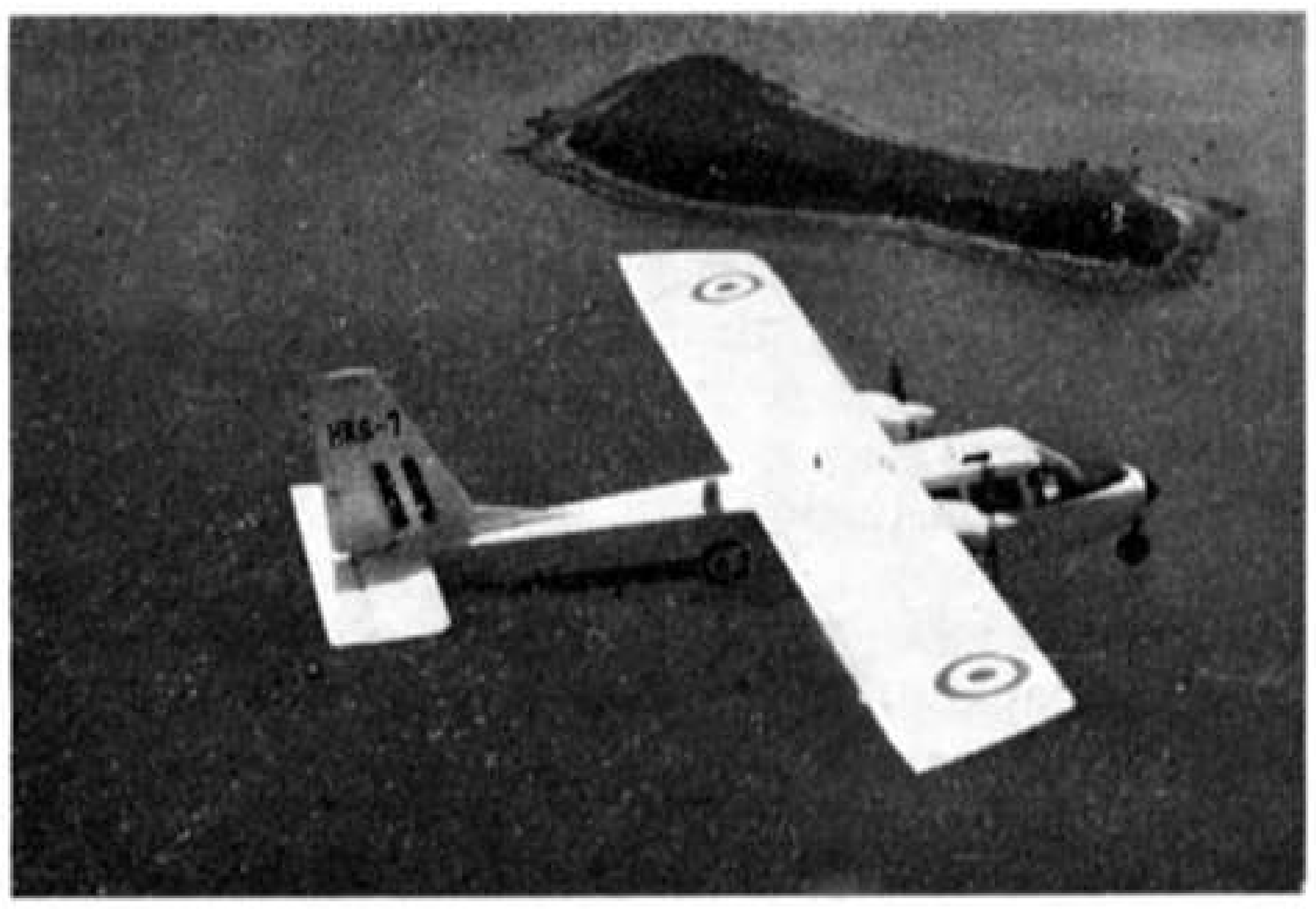
With one man always ashore on a month's relief, the select little company of four Nabmen are the chosen few of all Trinity House lightkeepers. Not for them the cramped and swaying lightship, nor the pencil-slender lighthouse; their home for two-month spells of duty offers roomy and snug quarters, with space to take plenty of exercise. Nevertheless, the tower is relieved only once a month by tender from Cowes, a visit that means fresh food, new bread, mail, newspapers and a fresh face for the crew who consider it takes them a week again to settle down to their fixed and solitary routine, baking their own bread, living out of tins, and so forth.

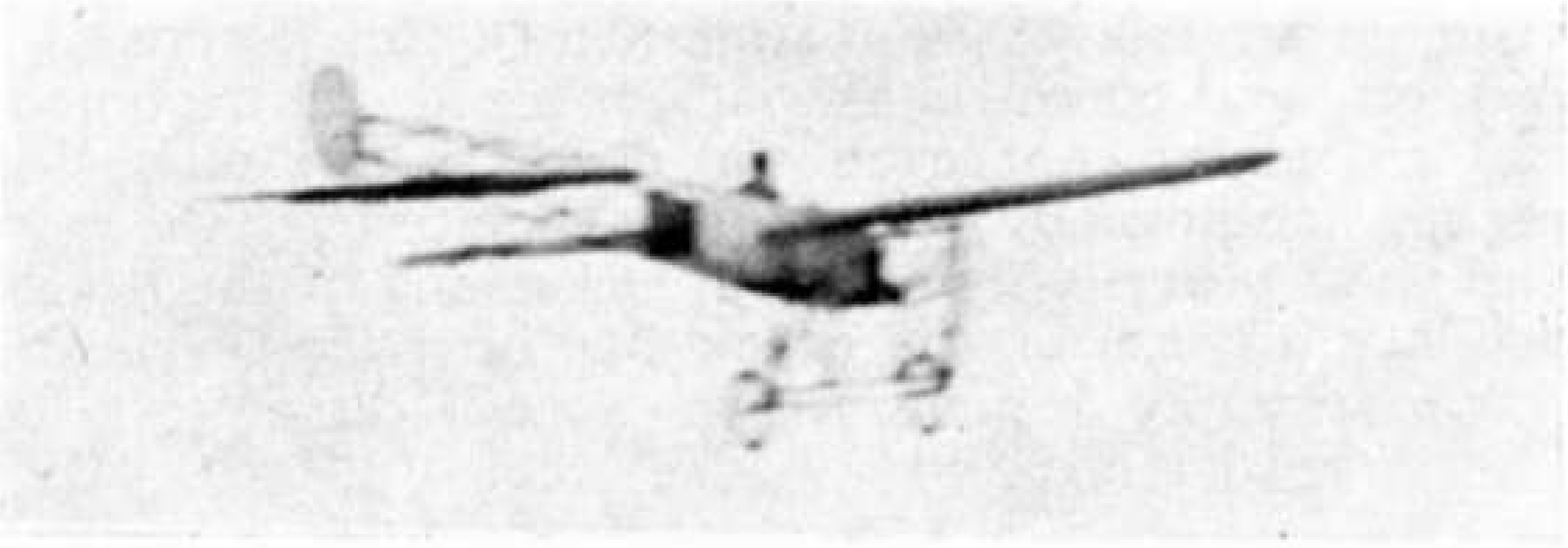
The loneliness can be as great as that on the most isolated lighthouse, especially in winter, but it is relieved by the close passage of a fascinating pageant of shipping from all over the globe, and the near-regular visits of an Isle of Wight padre who brings creature comforts and conducts a brief service for the Nabmen. But in winter, not even the chaplain can make his regular landings by launch from Bembridge, the rain and wind beat noisily on the metal casing of the tower, while at all seasons the experience of living in an all-metal structure brings its own special discomforts of heat and shivering cold.

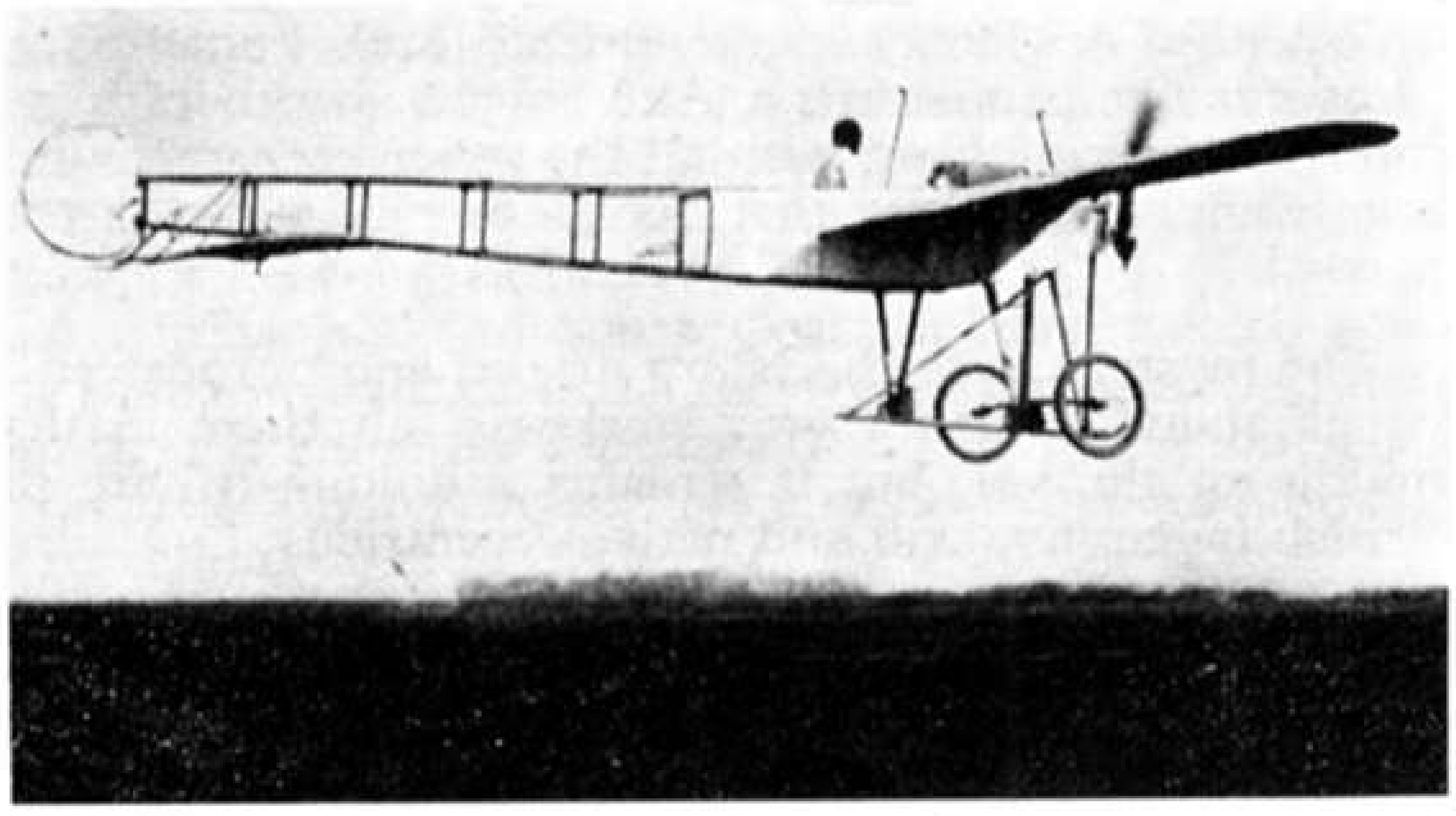
If the Nab is a lonely place, its little crew are a contented lot, mostly young, with the true lightkeeper's philosophy of lonely contentment, and home-made pleasures like handicrafts. And twice a day there is an informal radio link-up with all the other keepers round our coasts, an amenity that boosts morale, if that were needed.

The mystery as to the Nab's origins and purpose still clings about its gaunt grey starkness out there in the middle of the sea, but it remains a unique tribute to British ingenuity, skill and native eccentricity.









AIR NEWS

BY JOHN W. R. TAYLOR

Six-plane Air Force

A colleague named Peter Iliffe-Moon has sent me a story about an air force that has only six aircraft, none of them armed, and spends much of its time helping to put places on the map rather than wiping them off it. This may sound tame, but the tiny Royal Hong Kong Auxiliary Air Force already has a history of which it can be proud.

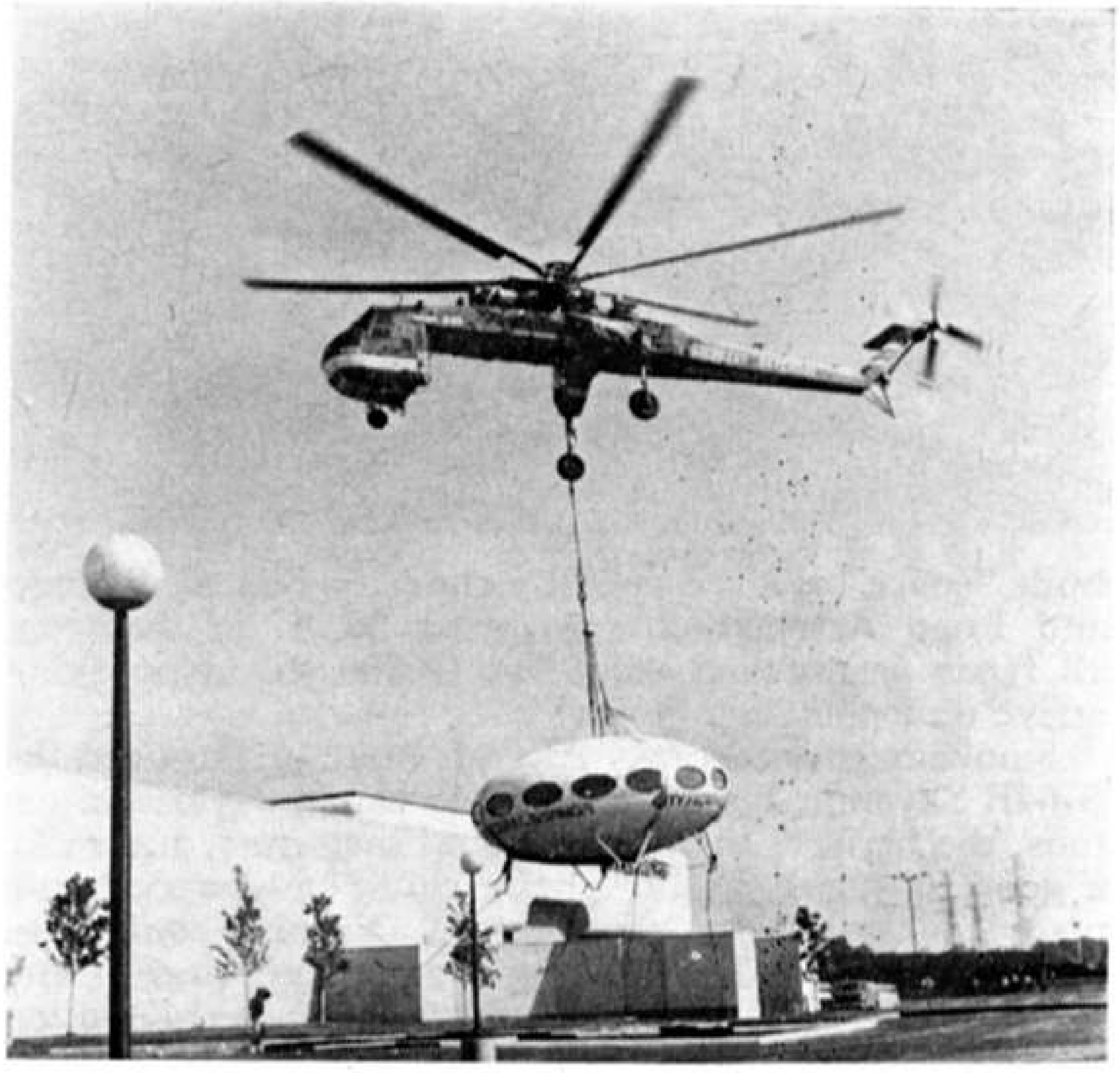
It began life in 1949 as the air arm of the Hong Kong Defence Force, which became "Royal" two years later. Equipped with four Auster lightplanes for training and observation, four Harvard trainers and four rocket-firing Spitfires, its main duty in those days was to provide fighter support for ground forces. But, as the nineteen-fifties brought increasing security to Hong Kong, the Harvards and Spitfires were phased out, although a single "Spit" F.24 (VN485) is retained for display at Kai Tak Airport.

The HKAAF was the last air force in the Commonwealth to fly Spitfires operationally and is today the Commonwealth's last surviving operational auxiliary air force. The others were all absorbed, on independence, into various national forces. It remains responsible for internal security, but there would be little point in its trying to look aggressive. With only 400 square miles of land, Hong Kong is the smallest territory in the world to possess its own air force. On the other side of its only border is China, with the largest population of any country in the world and with an air force of more than 2,500 combat aircraft, including bombers armed with atomic weapons.

What strangers seldom realise is that Hong Kong is both mountainous and made up of 236 islands. As a result, when the HKAAF bought its first two helicopters in 1958, it soon realised that it could perform a real service by operating flying-doctor and casualty evacuation flights to help anyone in trouble in a remote or inaccessible place.

The two Westland Widgeons were soon a familiar sight in Hong Kong, and one of them earned the Queen's Commendation for its pilot, Flt. Lt. Danny Cheung, in 1962, by enabling him to rescue an injured climber from the slopes of Tai Mo Shan, the colony's highest mountain, after dark. Not long afterwards, Flt. Lt. Cheung carried out an even more dramatic rescue of 44 crew members from a grounded ship during a violent storm, an exploit which gained him the coveted Air Force Cross.

In 1970 the Royal Hong Kong Defence Force itself was disbanded. The Hong Kong Auxiliary Air Force had proved itself so valuable that it was not only kept in



A Sikorsky S-64E Skycrane lifts a bank branch unit to its new site.

being as a separate entity but was granted the title "Royal" by Her Majesty The Queen. By then the Widgeons had given way to three French-built Alouette IIIs, each able to carry up to seven persons. Side-by-side with these "choppers", the unit now flies two Beechcraft Musketeer lightplanes, for training and reconnaissance, and a single twin-engined Britten-Norman Islander delivered in March of this year.

Pride and joy of the RHKAAF, the Islander has a busy life, being used for advanced pilot training, search and rescue and a wide variety of tasks to assist the civil authorities. It cost a fairly modest £68,750, but is modified to carry a Wild RC 10 aerial survey camera which added another £17,187 to the bill. Add to this a very comprehensive range of radio aids and a radar capable of locating even small ships up to a range of 40 miles, and it becomes clear why the pilots consider their Islander the best-equipped aircraft of its type in the world.

Up-to-date and accurate maps are important anywhere. In an area like Hong Kong, where development and reclamation are taking place at a tremendous rate, existing maps and plans quickly become outdated and useless. The Crown Lands and Survey Department is, therefore, keeping the camera-carrying Islander busy, taking photographs of the developing areas. These make possible constant correction of detail on the standard 1/1200-scale maps. The photos are also used to prepare accurately-contoured plans for engineering projects such as "borrow areas", where quantities of earthwork moved can now be measured simply and accurately. Another use is for measuring the precise capacity of the many reservoirs in the colony.

When the Islander is not being used for aerial surveys, it can carry either a ton of cargo or, with seats installed, eight passengers in executive-style comfort. However, the commanding officer of the RHKAAF, Wing Commander Simon Ellis, believes that it will prove its real worth in a search and rescue role.

Previously, the force had to rely on single-engined Musketeers or helicopters which, in the interests of their own safety, could conduct a search at sea only if accompanied by another aircraft. Even then their usefulness was limited by short range and lack of navigation aids. The Islander not only has twin-engine safety and an endurance of eight hours, but is equipped with every flying aid from autopilot to weather radar. As a result, the almost 90 part-time volunteers, Chinese and European, of the Royal Hong Kong Auxiliary Air Force, with their six aircraft, have every right to echo the feelings expressed many years ago by Admiral Lord Nelson: "We are few, but thank God we are the right sort".

The First 100,000

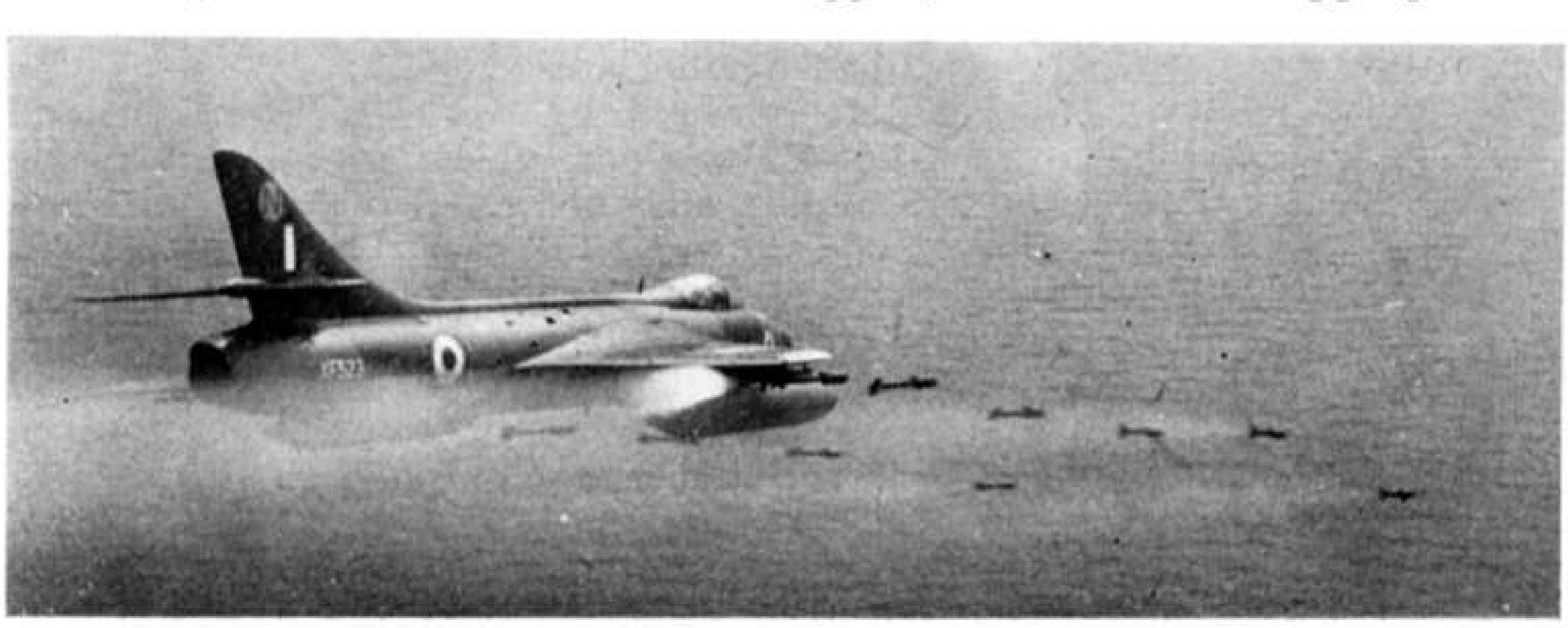
Moving from the smallest to the biggest, it was no surprise to learn recently that Cessna Aircraft Company had become the first manufacturer in the world to complete its 100,000th aeroplane. The company's founder, Clyde Cessna, built his first aeroplane in 1911. After that it was 52 years before the Cessna company reached the 50,000-aeroplane mark. The total has doubled in less than ten years, and is made up of 85,061 single-engined aeroplanes and 14,939 multi-engined machines.

The 100,000th aeroplane to leave the assembly line was, in fact, a Skylane with the registration N1CM. It was a good choice, as the Cessna 182/Skylane family accounts for 12,200 of the 100,000 total. Only two other Cessna types surpass it: the four-seat low-cost 172/Skyhawk family with a production total of more than 19,000 since 1955, and the world's most popular trainer, the Model 150, of which over 16,600 have been sold in 14 years.

In case you are not yet tired of astronomical figures, you might like to know that 48,000 Cessnas log upwards of 10 million flying hours each year in America, compared with a mere 6 million hours flown by all the nation's scheduled airlines added together. Of all the flying training done in America, 61 per cent is in Cessna products. Total miles flown in Cessnas each year in the USA is estimated at more than 1,300,000,000, which is a long way by any standards.

Bank Robbers Note

The citizens of Stratford, Connecticut, might well have rubbed their eyes recently on seeing what looked like a genuine flying saucer, with portholes, about to alight in the main parking area of their Woodbridge Shopping Centre. In fact, the structure was a factory-



A Hunter FGA Mk 9 firing rockets. Opposite page, top, the Hong Kong Air Force. Left hand column, top to bottom, Clyde Cessna's first aeroplane with a 60 h.p. Elbridge engine. Cessna's second aeroplane with a 60 h.p. Anzani engine. 1972 Skylane — Cessna's 100,000th aeroplane. A. Stevens and L. Medico of G.A. Service Corp., accept the 100,000th Cessna.

Volkswagen's Britten-Norman Islander.

built "space bank", owned by the City Federal Savings and Loan Association, measuring 26 ft. in diameter, 12 ft. in height and weighing 13,500 lb. Nor did it arrive under its own power.

Knowing that Sikorsky Aircraft build at Stratford the S-64E Skycrane helicopter, able to haul a payload of ten tons, the bankers thought it would save time, and make a good story, if the new bank could be dropped into place by one of the "choppers". Nothing could have been simpler. The building was placed gently into position with its carpeting, counters, cabinets and seating already installed. Electrical and telephone connections were made immediately and the bank was opened for business 30 minutes after it was lowered from the sky.

Any local bank-robbers who may have been given ideas by the operation should remember that it is probably cheaper to buy a bank than a Skycrane. Anyway, police helicopters are faster than an S-64E carrying a bank.

Old Friends Return

It seems a long time since we were able to watch a squadron of Hawker Hunter fighters taking off from an RAF station in Britain with a heavy load of rockets or bombs under their wings. It may not be long before we do so again.

The RAF has suddenly realised that it is due to get a very large number of Anglo-French Jaguar strike aircraft during the next year or two, and may not have sufficient trained ground-attack pilots to fly them. So, to ensure an adequate supply of pilots and to provide them with realistic training in the meantime, two squadrons of Hunters are being formed in the UK. No. 45 Squadron will have begun to form at RAF West Raynham, Norfolk, by the time you read this issue of the *Meccano Magazine*. It will transfer to Wittering, Northants, after a few weeks. Then, as soon as sufficient Hunters have been prepared for service, it will split to form the second squadron. Each will eventually have eight Hunter FGA Mk 9 fighters and one Hunter T Mk 7 two-seat trainer. Their primary task will be to train pilots to the high standards required for the Jaguar, but they will be available for operational tasks, if necessary.

Volkswagen Buy British

Whenever the famous Volkswagen VW badge appears on an aeroplane, it can be assumed that the power plant is a conversion of the famous air-cooled "flat-four" that has gone into millions of "Beetle" motor cars. There is, however, one exception to the rule. Volkswagen GB has just bought a 300 h.p. Britten-Norman Islander to operate an Express Parts Service between Manston in Kent and the VW factory at Kassel in Germany. As can be seen in the photograph, the aircraft carries prominent VW insignia.

First vehicle importers in Britain to purchase an aircraft for parts supply, Volkswagen are using it to back up their claim of being able to deliver quickly 95 per cent of all the 24,000 spares in normal demand. Until recently, the odd five per cent consisted of parts which were likely to be required less than twice in six months throughout the whole of the U.K. and could be obtained within four or five days by air freight from Germany.

The Islander has halved the delivery time for such parts. It flies the cross-Channel shuttle four times each week and is used for freight runs within the U.K. on the fifth day. It is also available for ferrying VW personnel between the U.K. and Germany and within Britain.

Turboprop Transport from Turin

After taking one quick glance at the transport aircraft illustrated on this page, you might be excused for thinking to yourself "Transall C-160" or even Hercules and switching your attention to pictures of seemingly less familiar aircraft. In fact, a second glance would show that it has only two engines and is a lot smaller than either of the types mentioned.

It is the second prototype of the Italian G222, designed and built at Turin by the former Fiat company which now forms part of the Aeritalia consortium. The general configuration is almost inevitable nowadays for a military transport, with turboprop engines for long range, a high wing to carry the engines and propellers well clear of debris thrown up by rough front-line airstrips, a circular fuselage in case it needs to be pressurised, and fairings on each side of the cabin into which the main wheels retract in flight.

Extra windows above and to each side of the flight deck give the pilots the best possible view for landing in places that might be small and surrounded by trees or buildings. The rear fuselage is sharply upswept, with a loading ramp built into the bottom for speedy loading and unloading of vehicles and freight. As in other modern military transports, this ramp can be lowered in flight for air-dropping of supplies and equipment, and the nose-cone houses radar to assist navigation and avoidance of bad weather areas.

The G222 is powered by two 3,400 h.p. General Electric T64-P-4D engines, which give it a cruising speed of 273 m.p.h., a normal range of 2,019 miles and the ability to take off with a full load in less than 2,000 ft. Wing span is 94 ft. 6 in., length 74 ft. 5½ in. and maximum take-off weight 57,320 lb., carrying up to 44 troops, 36 stretcher patients and eight attendants or seated casualties, or nearly 21,000 lb. of freight. Forty-seven are being ordered initially for the Italian Air Force.

The second prototype of the Italian G222.

Build a Mobile Tower Crane

'Spanner' describes a working model for Meccano No. 7 Set owners

HIGH in the Meccano popularity stakes are—and always have been—cranes of all shapes and sizes. Often has it been said that cranes form ideal subjects for Meccano modelling, and this is a statement which I would not dream of contradicting. I couldn't, even if I wanted to, because it's absolutely true! Cranes do lend themselves perfectly to reproduction in Meccano, their design features usually corresponding exactly with the outline shapes of many Meccano parts. You might say, "They're naturals".

From the average modeller's point of view, however, the realism it is possible to achieve is only part of the story. Of equal, if not greater importance is the fact that Meccano cranes can be easily made to work just like the real things; they can be made to lift, luff, slew and travel so that, having been built, they can be realistically used, thus allowing the modeller the continuing enjoyment of operation, in addition to construction. And, as I have often said before, we all know a working model can give considerably more satisfaction than a static reproduction.

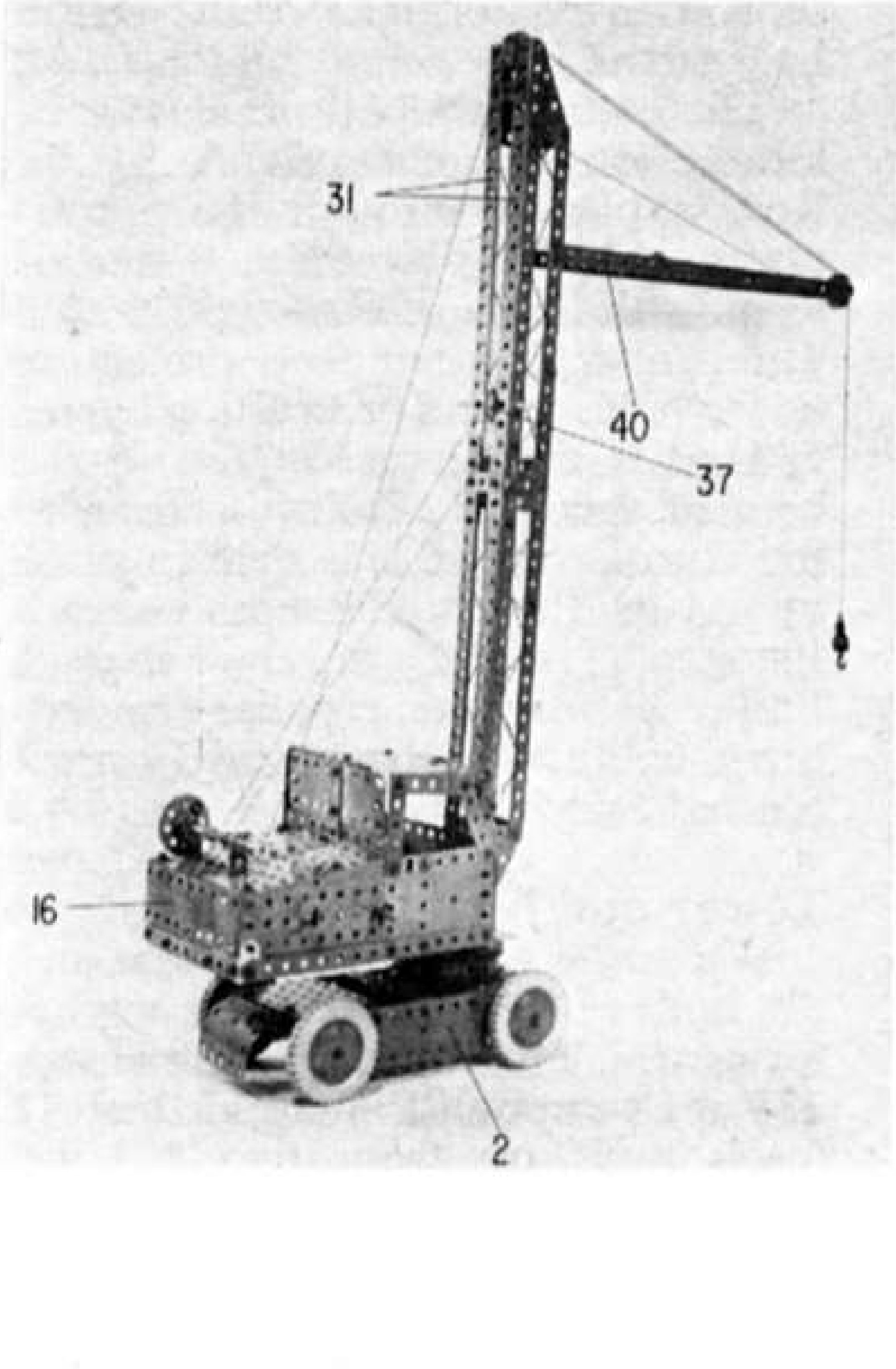
With this in mind, we feature here an interesting model of a Mobile Tower Crane, built with a No. 7 Meccano Set. Although not tremendously complex and detailed in design, it does capture the general lines of its full-size counterpart and it certainly reproduces its movements, thus resulting in a very worthwhile offering.

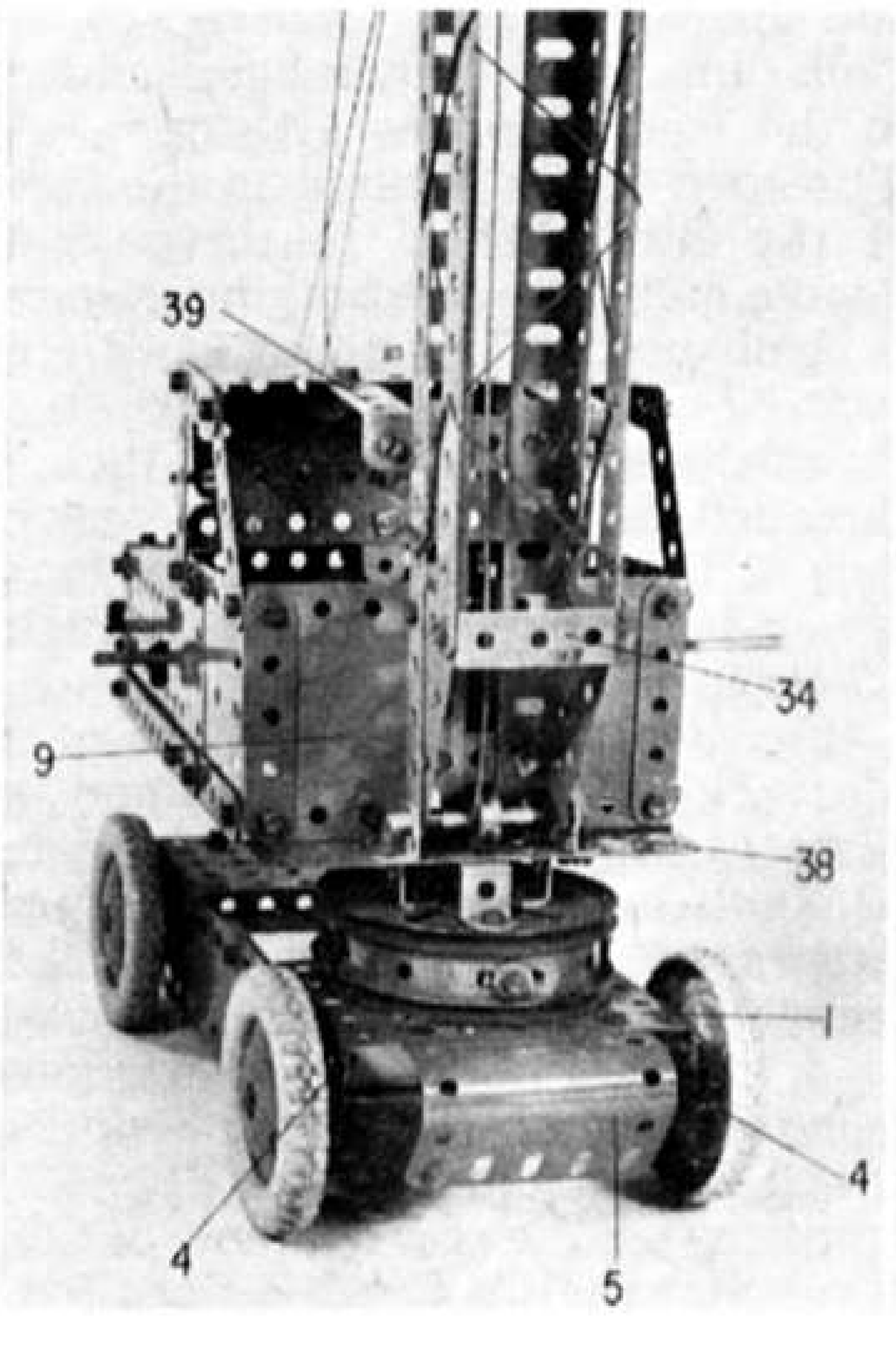
Construction begins with the mobile chassis. Two 3½ × 2½ in. Flanged Plates 1, separated by a distance of five clear holes, are connected together by two 5½ in. Strips and two 5½ × 1½ in. Flexible Plates 2, bolted between the side flanges of Plates 1. The centres of the Strips and Flexible Plates at each side are connected by a 3½ × ½ in. Double Angle Strip 3, while four Flat Trunnions 4 are bolted, one to each flange of each Plate 1 to provide bearings for the two road axles. Each axle is supplied by a 5 in. Rod and is journalled in the centre vertical holes of the relevant Flat Trunnions where it is held in place by 2½ in. Road Wheels. A U-section Curved Plate 5 is bolted to the outside edge of one Plate 1, while an ordinary 2½ × 2½ in. Curved Plate is secured to the other Plate 1 to nicely round off the chassis.

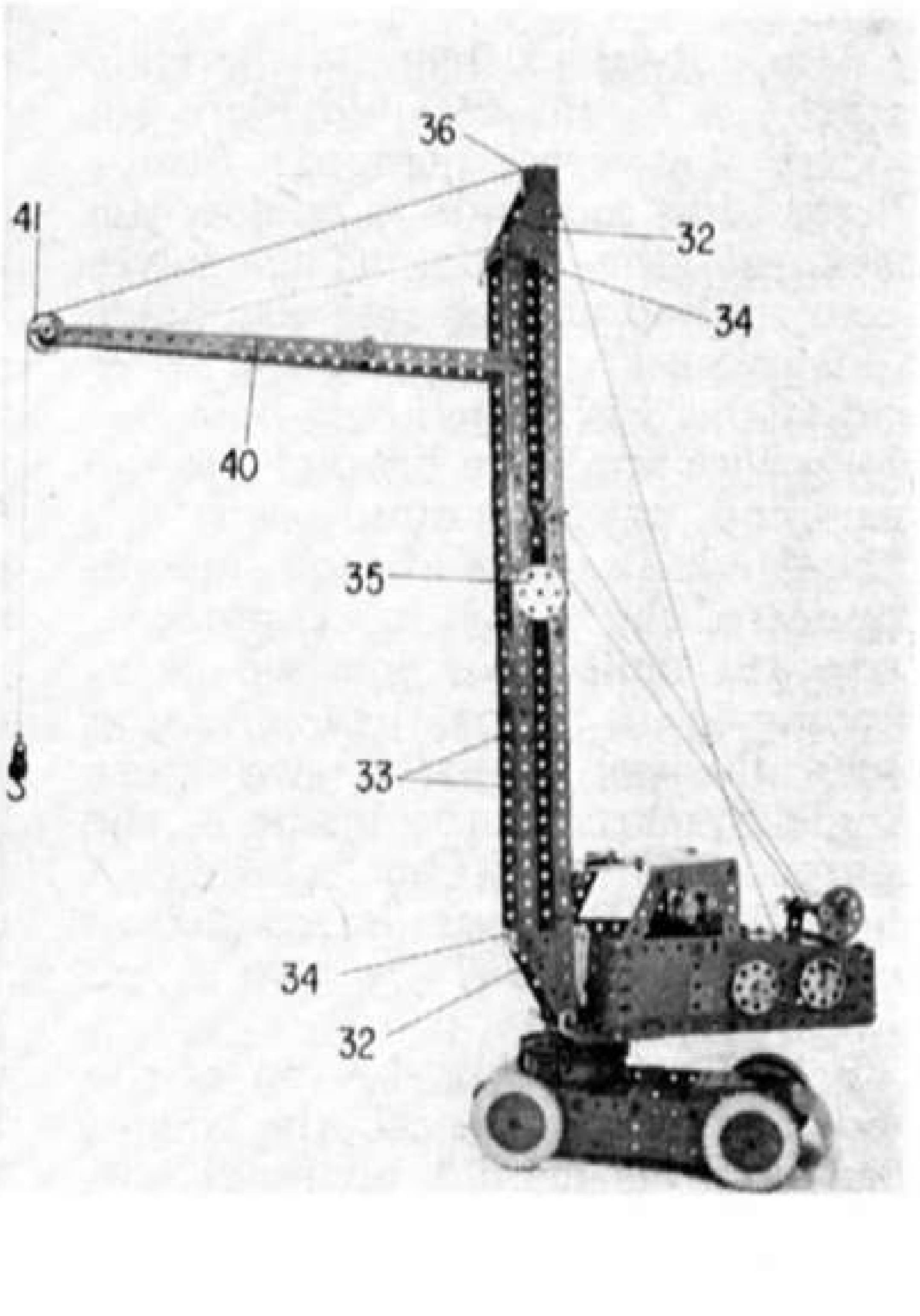
Fixed by ⅜ in. Bolts to the top of the Flanged Plate carrying Plate 5 is a 3 in. Pulley, the boss of the Pulley coinciding with the second row (from rear) centre hole of the Plate. Packing Washers are carried on the Bolts as necessary. Attached by an Angle Bracket to the top of the Pulley is a circular arrangement 6, built up from four Formed Slotted Strips, bolted together. The Strips should be curved slightly more than as supplied and use must be made of their slotted holes to ensure that the resulting circle fits inside the raised lip of the Pulley and sits on the flat area of the face.

Crane Body

Turning now to the body of the crane, a strong base is produced from a longitudinal 5½ × 2½ in. Flanged Plate 7, flanges upward, which is extended two holes forward by a laterally-mounted 4½ × 2½ in. Flat Plate 8. Bolted to the forward flange of Plate 7 is a 4½ × 2½ in.



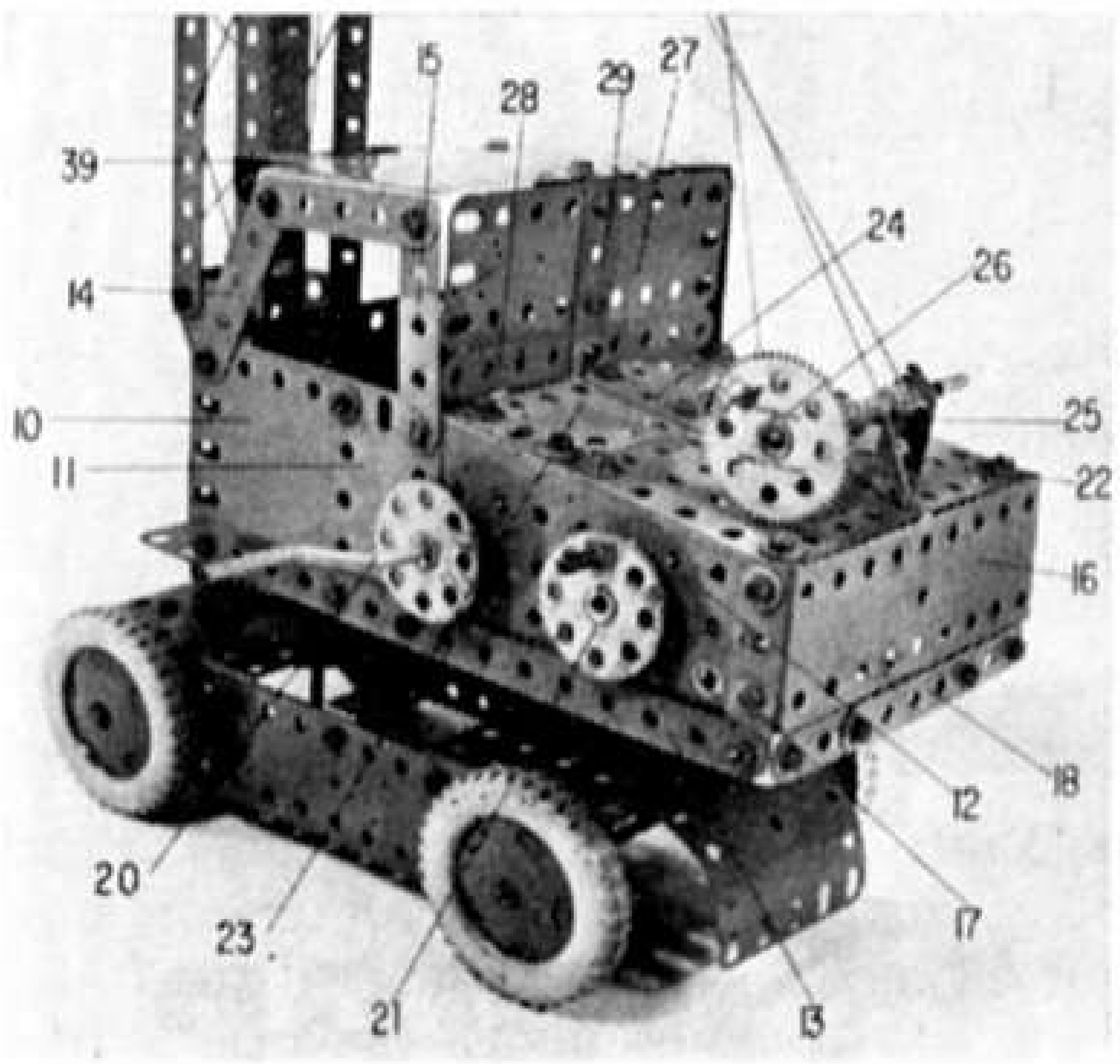


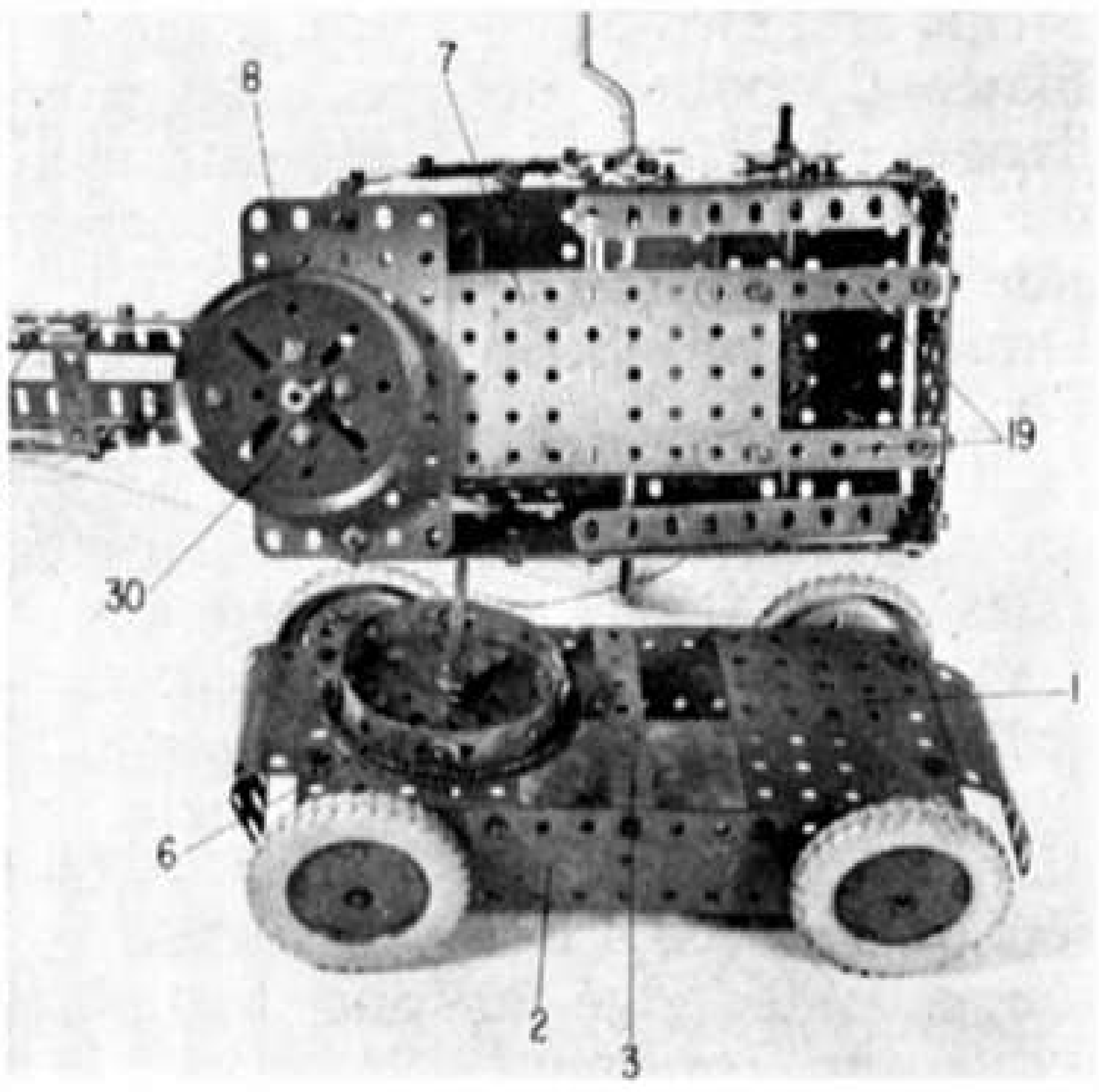


Left, general view of the completed Mobile Tower Crane showing its realistic outlines.

Centre, a frontal view of the body and chassis, showing the method of fixing the tower in position.

Right, Meccano Outfit No. 7 contains all the parts needed to build this Mobile Tower Crane.





Far left, construction of the crane body and the positions of the control handles are clear from this close-up view of the left-hand side of the model.

Left, in this view of the model, the superstructure has been separated from the chassis to show the underside of the body.

Flexible Plate 9, the ends of which are overlaid by 2½ in. Strips and the lower corners attached to Plate 8 by Angle Brackets. The upper corners of Plate 9 are attached by Angle Brackets to the side of the model, each of these sides being similarly built up from a 2½ × 2½ in. Flexible Plate 10, a 2½ × 1½ in. Flexible Plate 11 and a Flanged Sector Plate 12, all overlaid along their lower edges by a 7½ in. compound strip 13, supplied by two overlapping 5½ in. Strips. The lower forward corner of the side is attached to Plate 8 by another Angle Bracket.

Note that the Bolt fixing the upper Angle Bracket to the side also holds in position a 2½ in. Strip 14, this being angled rearwards slightly to serve as part of the cab window surround. Another 2½ in. Strip 15 is bolted to the cab side, through its seventh hole, then the upper end of this Strip is connected to the upper end of Strip 14 by a third 2½ in. Strip, the securing Bolts also holding the cab roof in position. This is simply supplied by a 5½ × 2½ in. Flexible Plate, curved to shape at the ends.

Also curved to shape at the ends is a 5½ × 1½ in. Flexible Plate 16, bolted between Flanged Sector Plates 12 at each side to enclose the back of the body. The lower securing Bolt at each side also holds a Fishplate 17 in position, the lower end of this Fishplate being bolted—along with an Angle Bracket—to the rear end of compound strip 13. The Angle Brackets at each side are connected by a 4½ in. compound strip 18, built up from two overlapping 3½ in. Strips, the connecting Bolts themselves fixing two more Angle Brackets to the inside of the compound strip. The free lugs of these Angle Brackets are connected to Flanged Plate 7 by two 3 in. Strips 19.

Before completing the top of the body and back of the cab, the jib and load controls should be fitted and wound with cord while there is still room to move. The load control is supplied by a 5 in. Crank Handle 20 extended, with a Rod Connector, by a 1½ in. Rod, the resulting shaft being journalled in the second row centre holes of Flanged Sector Plates 12 where it is held in place by an 8-hole Bush Wheel at one side and a Spring Clip at the other. A standard Meccano Bolt screwed into one tapped bore of the Bush Wheel boss engages with the shank of another Bolt, held by a Nut in a nearby hole in the Flanged Sector Plate, to act as a brake. The shaft must therefore be able to slide a short distance in its bearing to enable the brake to be disengaged. A Collar is mounted on the shaft inside the body and near to the left-hand Sector Plate to serve as a "stop" preventing the shaft from sliding more than the required distance.

The jib control is supplied by a 5 in. Rod journalled in the sixth row (from the front) centre holes of Flanged Sector Plates 12, where it is also held in place by a Spring Clip and an 8-hole Bush Wheel 21. A Collar inside the body is again added to the Rod to act as a "stop". A Threaded Pin is secured to the face of the Bush Wheel to serve as a handle and the same braking system is again used. Length of Cord are secured to the control shafts, the forward load-hoisting Cord being threaded through the bottom centre hole of Flexible Plate 9 and the rear jib cord later being threaded through a hole in the top of the Body.

The body top itself consists of a 4½ × 2½ in. Flat Plate 22 and a 5½ × 1½ in. compound plastic plate 23, both bolted between the upper flanges of Sector Plates 12. The compound plate is built up from two 2½ × 1½ in. Plastic Plates, the join being overlayed by a 2½ in. Strip 24 which is also bolted to Flat Plate 22. It is through the rear end hole of this Strip that the jib Cord is threaded.

Bolted to the top of Flat Plate 22, in the positions shown, are two 1 × 1 in. Angle Brackets 25, in the end holes in the spare lugs of which a 3½ in. Rod is journalled, being held in place by a Spring Clip and a 57-teeth Gear Wheel 26. A Pivot Bolt is locked in the face of the Gear Wheel to serve as a handle, while a ⅜ in. Bolt screwed in the boss of the Gear engages with the shank of a standard Bolt, secured in the second hole of the nearby Angle Bracket lug, to act as a brake. The Rod must, again, be able to slide a short distance in its bearings to enable the brake to be disengaged. Cord wound round the Rod will later control the tower attitude.

The back of the cab is now completed by a 4½ × 1½ in. compound flexible plate 27, built up from two 2½ × 1½ in. Flexible Plates, and a 4½ in. compound strip 28, built from two 2½ in. Strips, the joins being overlaid by a vertical 2½ in. Strip 29. The compound plate and overlaying Strip are bolted to one lug of a Double Bracket secured to the centre underside edge of the cab roof, while the compound strip—with the same overlaying Strip—is attached by an Angle Bracket (made slightly obtuse) to the centre forward edge of compound plastic plate 23.

Finally in the body section of the model, a 3 in. Pulley 30 is secured by four ½ in. Reversed Angle Brackets to the underside of Flat Plate 8, the Pulley boss coinciding with the second row (from the front) centre hole of the Plate.

The completed body can now be located on the chassis. A 3½ in. Rod is passed through the appropriate hole in Flat Plate 8 and is *fixed* in the boss of Pulley 30 with a little under 2 in. of Rod projecting downwards. This protruding length of Rod is then located, *free*, in the boss of the 3 in. Pulley secured to the chassis, where it is held in place by a ½ in. Pulley with boss beneath Flanged Plate 1 of the chassis. Pulley 30 rotates on circular arrangement 6 built up from the Formed Slotted Strips.

Tower and Jib

We come next to the tower and jib, both of which are quite straightforward. The tower consists of two 22½ in. compound angle girders 31 (each built up from two 12½ in.

Angle Girders overlapped five holes), connected together by three 1½ in. Strips bolted through their third, twenty-third and forty-fourth holes, counting from the top. A 2½ × 1½ in. Triangular Flexible Plate 32 is bolted to each end of each compound girder, then two 18½ in. compound strips 33 are bolted, as shown, between the free corners of the Triangular Plates, at the same time fixing a 1½ × ½ in. Double Angle Strip 34 between the ends of the two compound strips at top and bottom. Each compound strip is built up from two 12½ in. Strips, overlapped thirteen holes. A 6-hole Wheel Disc 35 is bolted between the centres of the compound strip and compound girder at each side of the jib, while Cord is also threaded back and forth between the strip and girder and between the two strips to represent cross-bracing.

Held by Spring Clips in the upper end holes of compound girders 31 is a 2 in. Rod, on which two 1 in. Pulleys with boss 36 are freely mounted. A 3½ in. Rod carrying a fixed 1 in. Pulley 37 is journalled in the nineteenth holes of the girders, then the tower is pivotally connected to the body by a 2 in. Rod passed through the lower end holes of the girders and through the vertical lugs of two Angle Brackets bolted to the forward edge of Flat Plate 8. A ½ in. Pulley without boss 38 is mounted on the Rod, which is held in place by Spring Clips. A "stop" to prevent the tower from pivoting backwards onto the body is provided by a 2½ in. Strip bolted to the free lugs of two 2½ × ½ in. Double Angle Strips 39 which are in turn bolted to the underside of the cab roof in such a position that they project three holes forward.

Pivotally attached to the tower is the jib which consists quite simply of two 12½ in. Strips 40, lock-nutted through the seventh holes of compound strips 33. Strips 40 are themselves connected together through their ninth holes from the tower by a 1½ in. Strip, attached by Angle Brackets, while a 1 in. Rod, carrying two 1 in. Pulleys without boss 41, is held by Collars in the end holes of the Strips.

This leaves only the cording arrangements to be completed and the model is finished. The load cord attached to Crank 20 and projecting from the front of the body is passed round Pulley 38 in the base of the tower, is taken upwards and over left-hand Pulley 36, down and around left-hand Pulley 41 in the jib and is then completed with a Loaded Hook, tied to the end. The jib control cord projecting from the top of the body is taken up and over right-hand Pulley 36; down and around right-hand Pulley 41 and is then brought back up and tied to upper Double Angle Strip 34. The remaining tower attitude control cord is simply taken up and around Pulley 37, then is brought back and tied through the rearmost centre hole in Flat Plate 22 to finally complete the model.

PARTS REQUIRED

6—1
6—2
2—3
2—4
13—5
4—6a
4—8
2—10
1—11
16—12
2—12a
2—15
1—15a
3—16
2—17
1—18a
1—18b
2—19b
1—19h
3—22
2—22a
1—23
1—23a
2—24
2—24c
1—27a
7—35
133—37a
129—37b
28—38
2—48
2—48a
1—48b
1—52
2—53
2—53a
2—54
1—57c
4—59
6—111c
1—115
4—125
4—126a
1—147b
1—176
4—187
4—188
3—189
2—190
1—191
2—192
2—194
1—199
1—200
1—213
4—215
4—221

Riveting *(continued from page 434)*

laying 1½ in. Strip and an Angle Bracket. The forward ends of the short Angle Girders and the flanges of the 2½ × 1½ in. Flanged Plates are now joined by a further pair of 4½ in. Angle Girders 24, the upper right-hand Bolt fixing a second Angle Bracket in place. The vertical flanges of Girders 24 are connected by two 2½ in. Strips, one each end.

The left-hand bearings for the feed roller shafts are provided by two 1½ in. Flat Girders 25 bolted by their slotted holes to the vertical flanges of the 1½ in. Angle Girders. These should be adjusted to give correct meshing of two 1 in. Gear Wheels.

Bolted between the vertical slotted lugs of the two Angle Brackets is a Stepped Bent Strip 26 which simulates the device which applies pressure to the wire feed rollers. An inverted ¾ in. Bolt projects from the Bent Strip and is secured by Nuts so that a Collar 27 can be attached by one tapped hole. The "tommy bar" is provided by a 1 in. Rod passed through the Collar with two further Collars fixed one each end.

Fixed to the centre of a 4½ in. Strip is a 1 × ½ in. Angle Bracket 28, the slotted hole of which carries a Threaded Pin. On this Pin is mounted the rivet punch and extracting rocker which is made up from a stack of five 4½ in. Strips bolted together. These are secured to the Threaded Pin by a Collar and the assembly is then bolted to the vertical 2½ in. Strips at the front of the wire feed housing, inside the housing, the left-hand Bolt also securing in place a Double Bent Strip 29 fitted with a ¾ in. Bolt and Nuts to regulate the movement of the punch rocker. Finally, a further 4½ in. Strip is secured across the housing to complete this part of the assembly.

Crankshaft

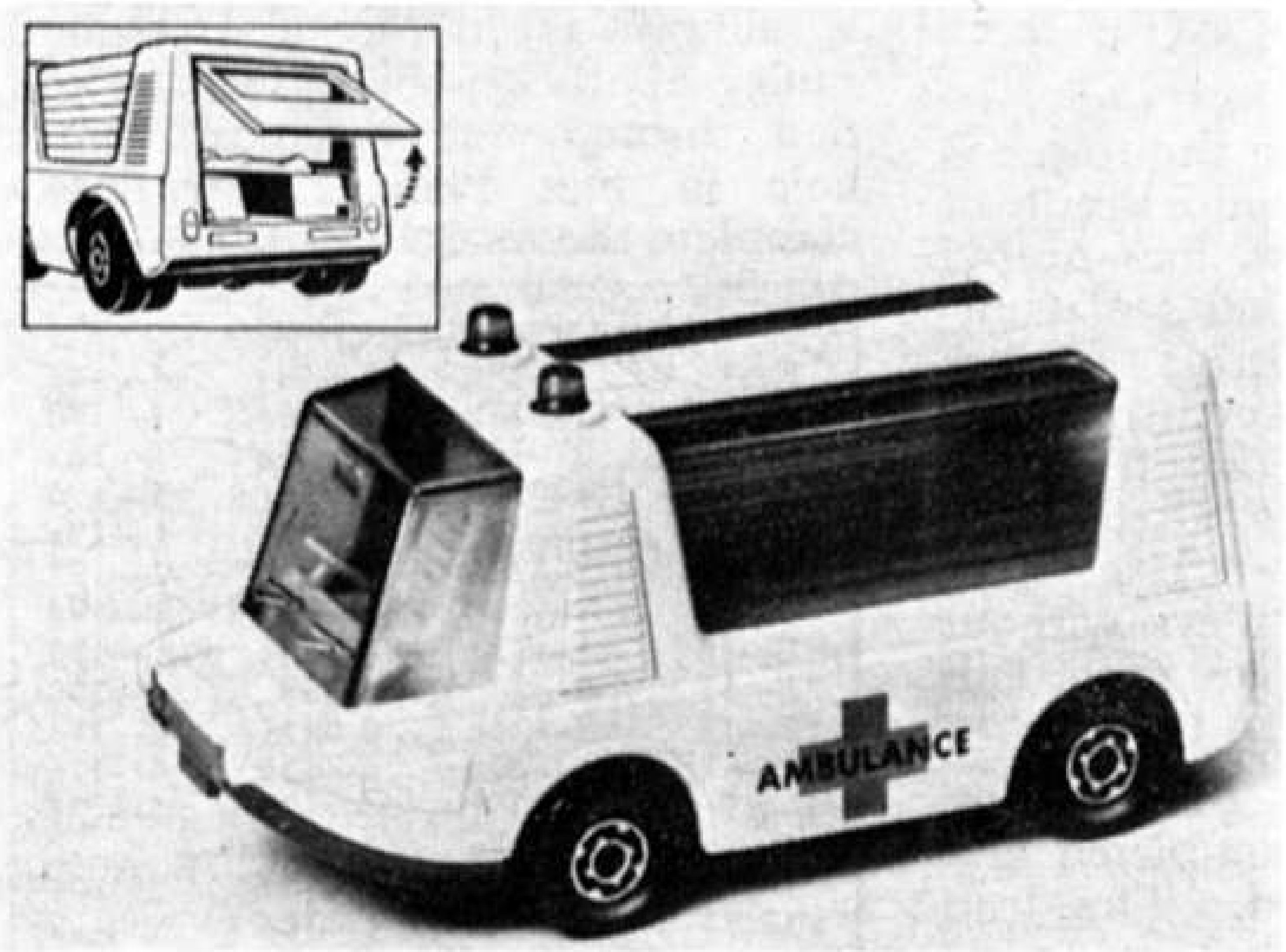
Next we come to the crankshaft, the left-hand half of which is provided by a 5 in. Rod and the right-hand side by a 4 in. Rod. Two Cranks 30 form each web, these being mounted upon the Rods with bosses outwards and securely locked in place. A Collar 31 and two Washers fill the space between each pair of crank arms, these being retained by Pivot Bolts passing through the slotted holes of the Cranks and screwed into the tapped holes of Adaptors for Screwed Rod 32. Two 3 in. Strips 33, which form the connecting rod, are fitted on to the plain shanks of the Adaptors which are then locked together by a Coupling 34 to provide a rigid crank pin, additional packing Washers being added to ensure a good fit.

Ram

In the case of the ram, a 2½ × 2½ in. Flat Plate 35 forms the top of the unit, this being overlaid each side by 3½ in. Strips. The four fixing Bolts—one at each corner—also retain (attached by their round hole flanges) a pair of 2½ in. Angle Girders 36 bolted across the assembly.

Two 2½ × 1½ in. Flanged Plates 37 form the front and back of the ram, but before these are fixed into place, both are fitted with a 5½ in. Angle Girder 38 centrally attached by the round hole flanges, these forming the runners upon which the ram slides. To the centre of the front Flanged Plate, is fixed a Coupling 39 with its longitudinal bore vertically disposed. The two fixing Bolts must carry Washers to ensure that, when the Coupling is secured, a Rod can slide freely up and down. This Coupling forms the bearing to carry the tool slide. The front and rear 2½ × 1½ in. Flanged Plates may now be bolted to the vertical slotted flanges of the 2½ in. Angle Girders, the two Bolts fixing the rear Plate in place also securing in position a 1½ × ½ in. Double Angle Strip 40, to which the toggle links are subsequently pivotally attached. Finally, the ends of the two 5½ in. Girders are connected by a pair of 3 in. Strips 41, bolted one each side.

(To be continued)



HAVE YOU SEEN?

Britten BN2 Islander, 1/72nd scale, Price 25p

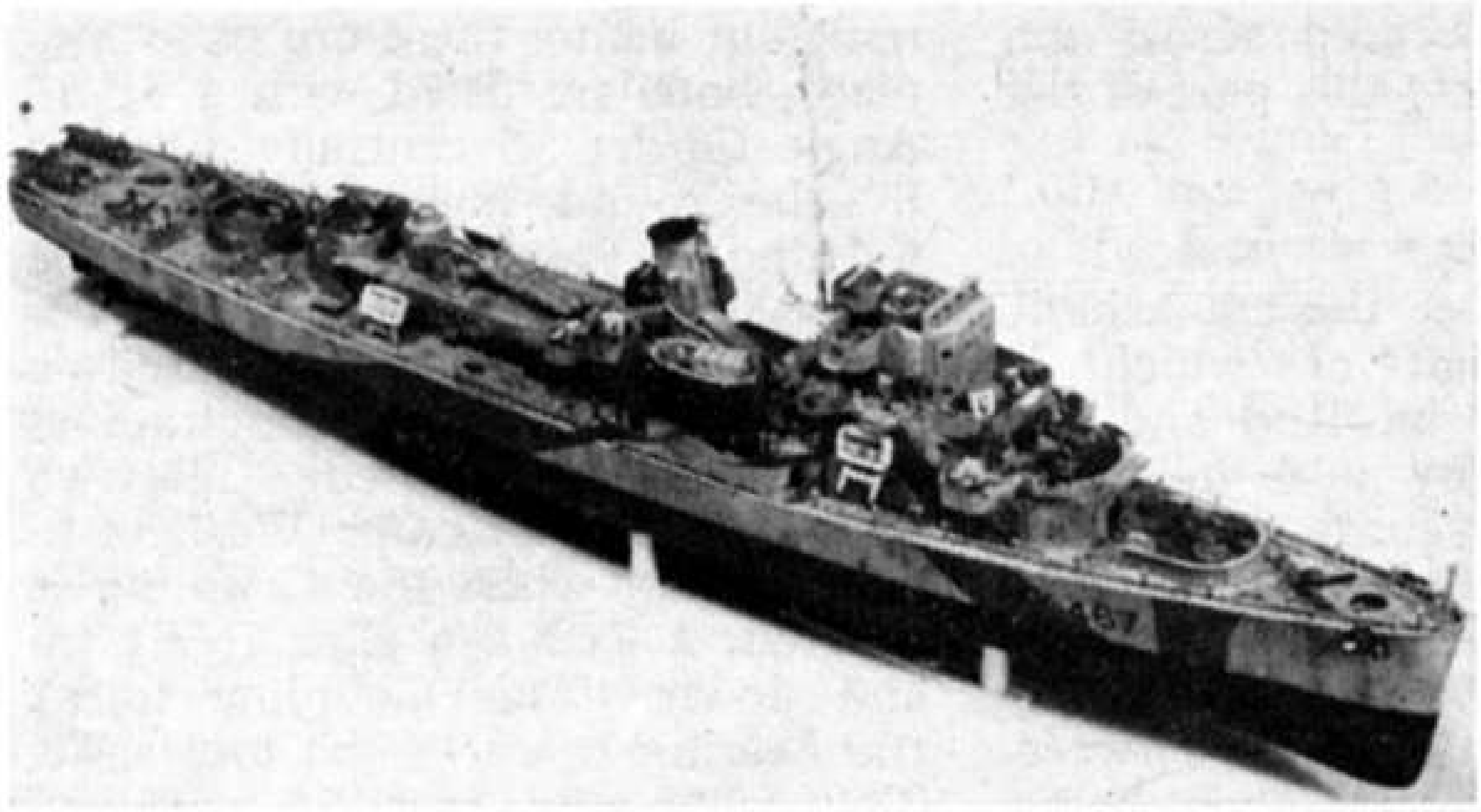
Over 300 aircraft of this type have been supplied to 150 operators in 53 countries. The 1/72nd scale Airfix model of this aircraft has 66 parts with a wing span of 8¾ in. and an overall length of 6 in. The kit has been produced in yellow polystyrene with a nicely detailed set of transfers to provide authentic markings included in the kit. Since the aircraft was produced to meet the specific needs of commuter airlines and bush operators, a choice of three versions is possible with this Airfix kit. Modellers can make up the model as a passenger, cargo or executive aeroplane and transfers have been provided for all but the latter version.

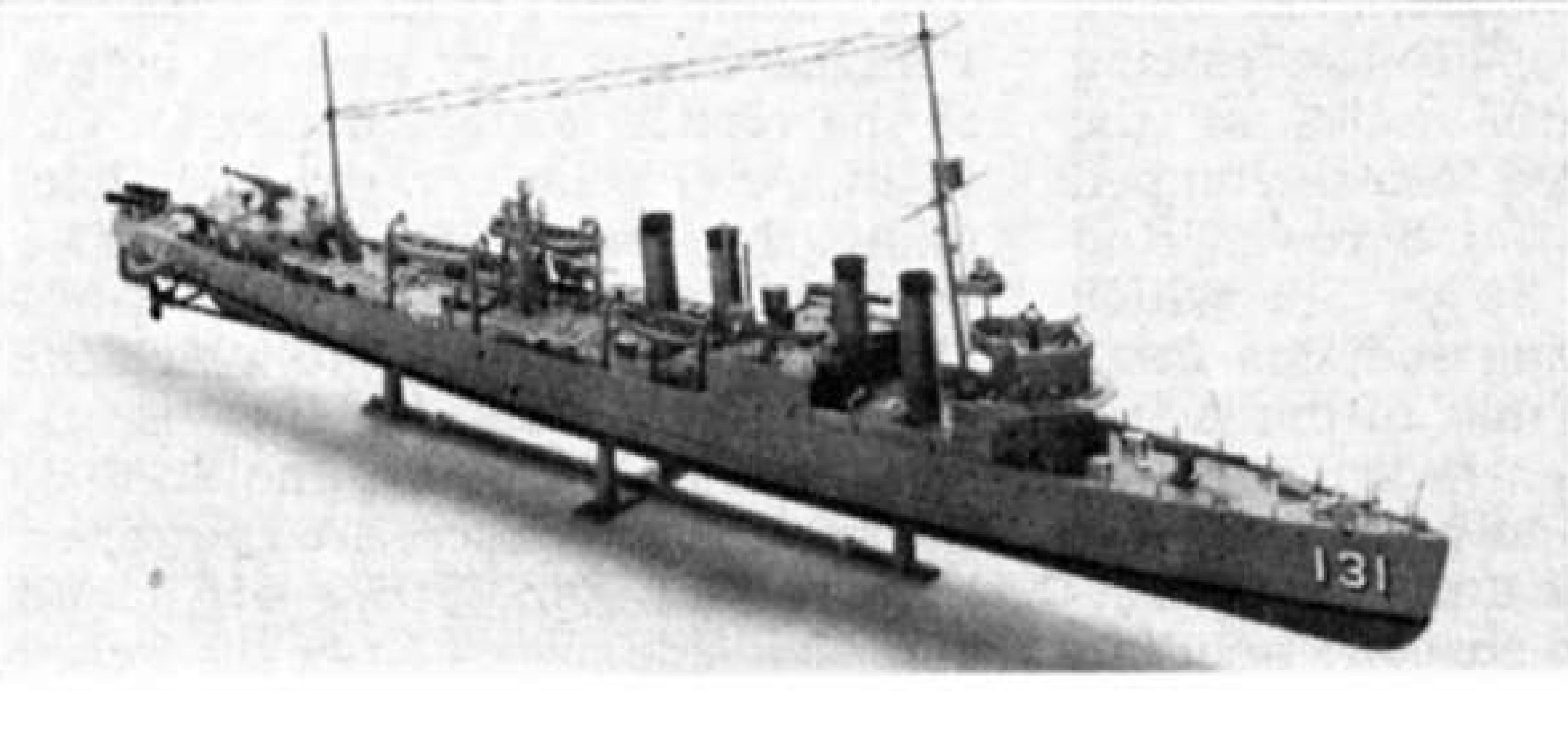
First stage of the modelling sequence is to build the cockpit which includes a sculptured figure of the pilot and then to assemble the interior of the cabin for whichever version is required. Specific instructions are included in the kit so that modellers know exactly which parts comprise each version. Enthusiasts will notice that Airfix have meticulously reproduced the airframe riveting and that the two 260 h.p. Lycoming 0-540-E engines have been accurately reproduced with rotating propellers. In the kit the undercarriage is fixed in position and transparent cockpit and passenger windows are provided. Inside the cockpit the instrument panel and passenger seats are fully detailed while external embellishments include landing lights, pre-formed ailerons and finely-moulded air intakes.

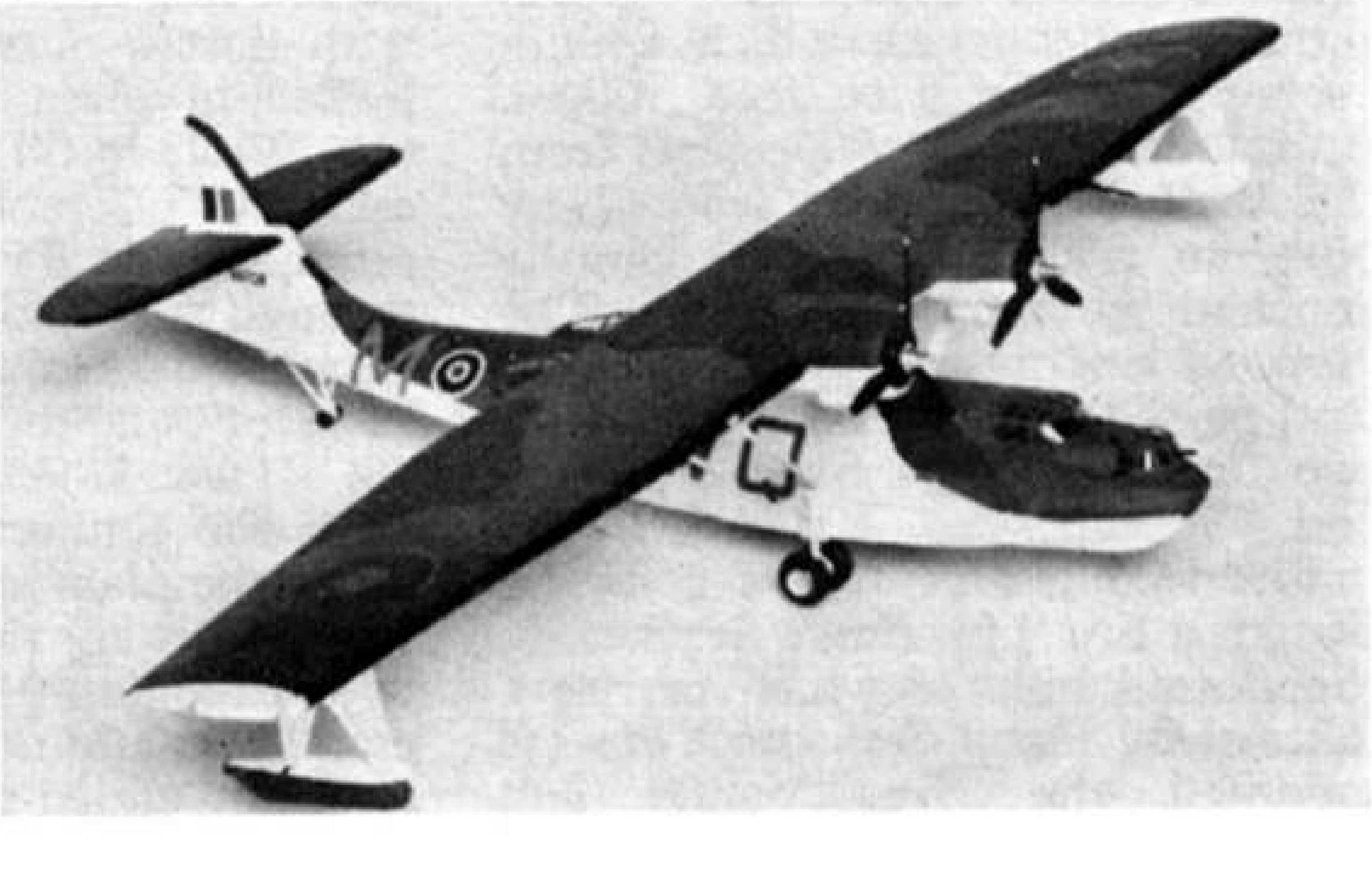
Vosper MTB, 1/72nd scale, Price 68p

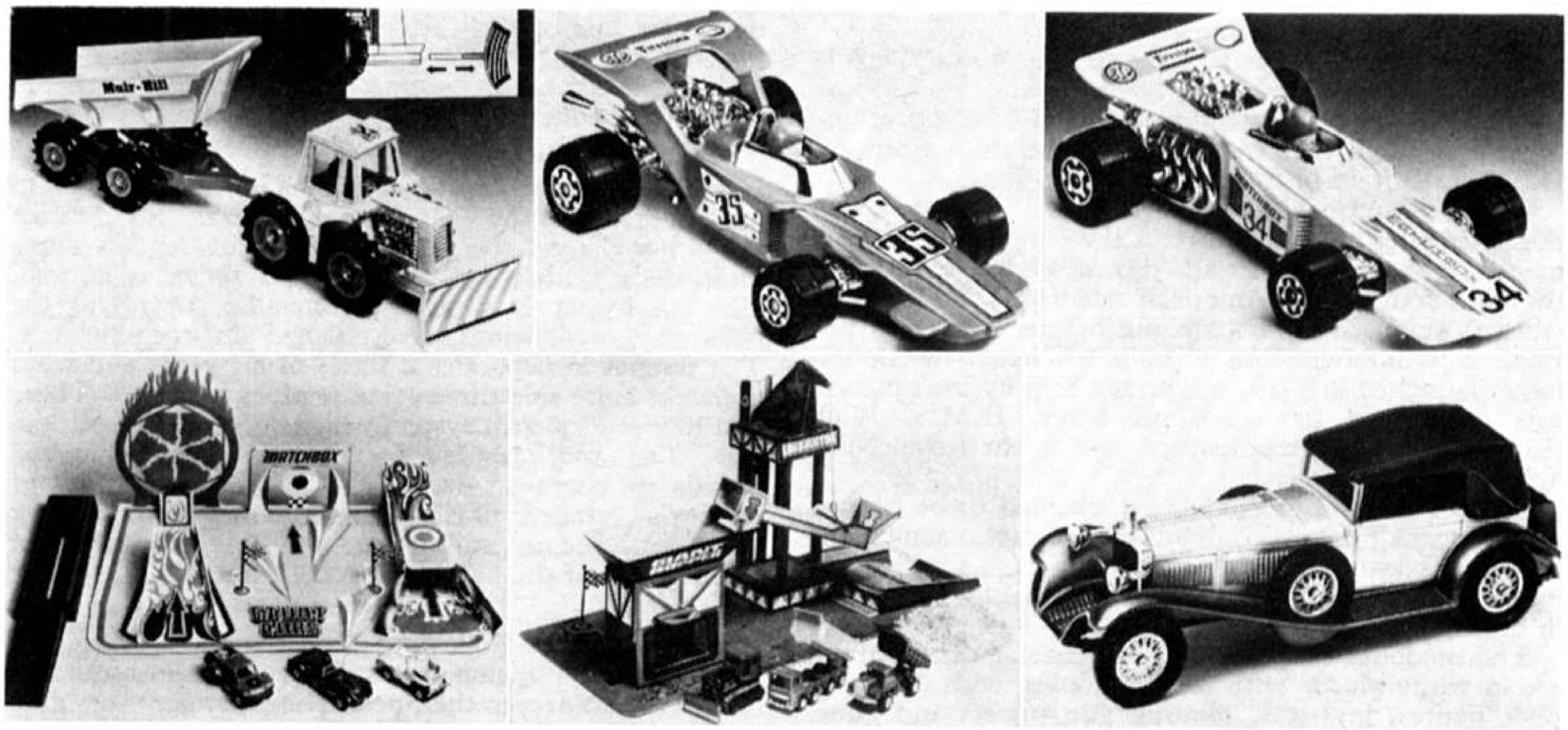
The new Airfix kit of the Vosper MTB is a completely accurate scale model of the third series version of the craft which played a key role with the Royal Navy during the Second World War. The 189 part kit, manufactured in light grey polystyrene, measures over 12 in. long when completed and includes a wealth of detail on the deck and superstructure. The first stage of assembling the kit is to cement the two sides of the sleek hull together, position the transparent portholes and then add the deck and superstructure. The twin 20 mm cannon is modelled separately, positioned on the circular gun mounting and the figure of a gunner is then fixed into place with the mounting rails acting as a support if desired. The twin cannon can be rotated and elevated.

The Vosper MTB carried four 18 in. torpedo tubes









Opposite page, two new Matchbox Superfast cars, No. 46 the Stretcha Fetcha and No. 51 Citroen SM. Above, top row, left to right, the Muir Hill tractor and trailer, Thunderclap and Lightning. Bottom row, stunt car set, Load-a-Vator and the Mercedes Benz "SS" all from Matchbox.

mounted on the flush deck in pairs alongside and behind the superstructure. In the kit the 3 in. long tubes are moulded in two sections which are cemented around a torpedo so that the tubes look completely authentic when they are cemented to the deck. One 5 in. gun is placed on top of each forward tube and one .303 in. twin machine gun on each of the aft pair. MTB's carried a crew of 12 and Airfix have included sculptured figures of one officer and four crew men to add a touch of realism to the completed model.

The deck detail is impressive and includes hatches, ventilators, life belts, anchor, ammunition boxes and life raft. On the bridge modellers will notice that particular attention has been paid to navigational and detection instruments and that two figures have been moulded in characteristic poses—one showing an officer using binoculars and the other showing the helmsman and the wheel behind transparent windscreens.

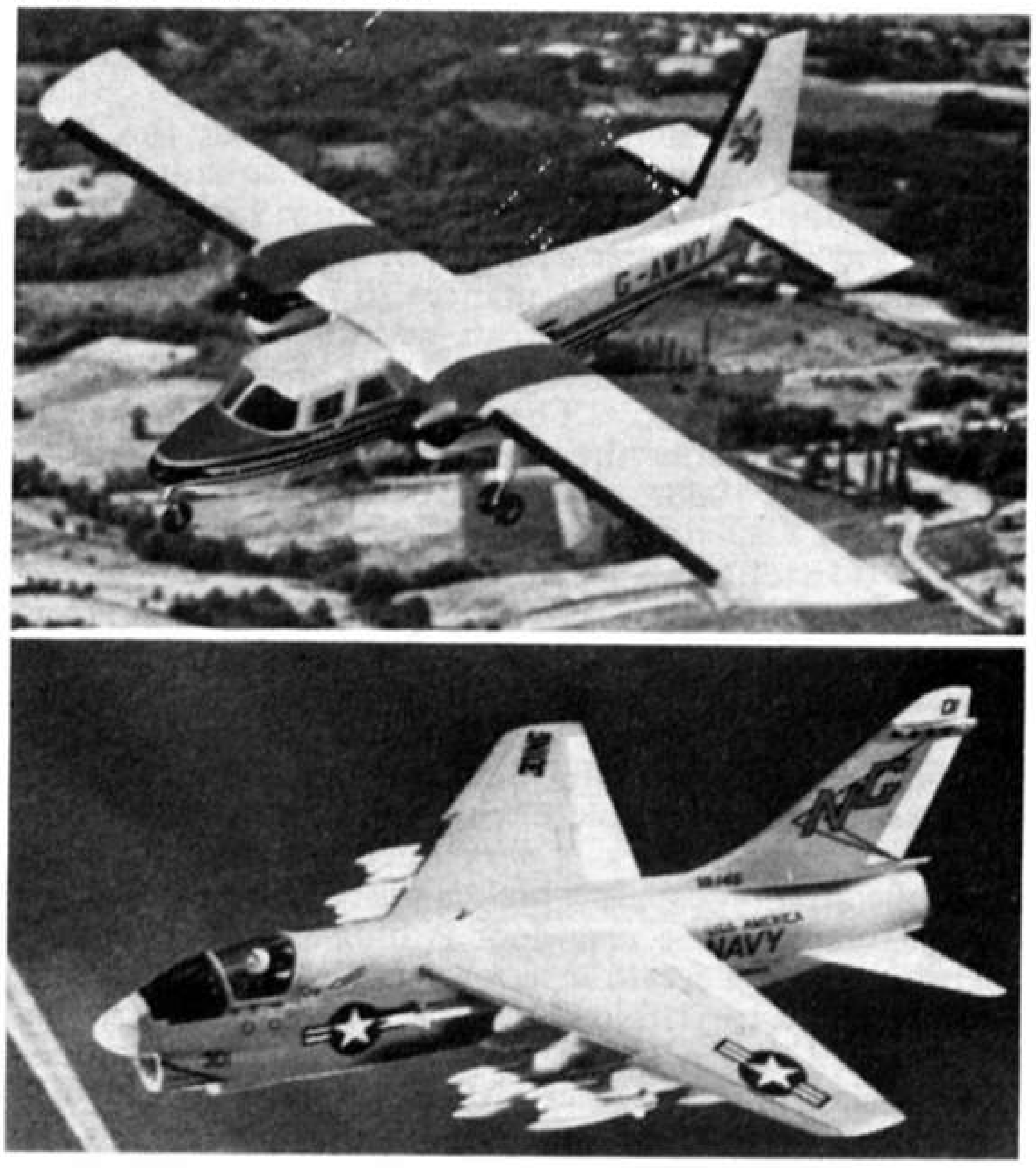
Waterloo British Cavalry (Hussars), HO/OO scale, Price 29p

A new 36 piece set featuring the Waterloo British Cavalry (Hussars) has been introduced by Airfix for use in conjunction with the Waterloo Highland Infantry, French Cavalry and French Artillery which have already proved to be best-sellers. The new set comprises a number of troopers on horseback in various battle positions and enthusiasts will notice that all the figures are reproduced in authentic uniform of the period which may be painted for extra realism. Although the figures stand less than 1½ in. high the ornate uniform, sword and back packs are shown in minute detail. Included in the set is a bugler, drummer, standard bearer, several troopers brandishing swords and even a hussar kneeling beside his wounded horse.

L-T-V A-7D/E Corsair II, 1/72nd scale, Price 25p

The Airfix construction kit of the Corsair II has 79 finely-detailed parts and measures 7¾ in. long with a wingspan of 6½ in. when completed. The airframe panel lines and the six underwing stores pylons, which can carry a variety of weapons, have been carefully moulded and capture all the realism of this light attack aircraft. Twelve 250 lb. bombs and other armaments and rockets are carried on the underside of each wing and the undercarriage and nose wheel can be modelled in the open or closed position.

Optional parts and transfers are provided so that the Airfix model can be made up as a US Navy A-7E or a US Air Force A-7D.



Opposite page, far left, Revell's H.M.S. *Bligh* (top) and *Campbeltown* (below) and left the Flying Fortress IIb (top) and Catalina (below) again from Revell. Right, two new kits from Airfix, the Britten BN2 Islander (top) and the L-T-V A-7D/E Corsair II.

Five New Model Kits from Revell

All but one of these kits are of the World War II favourites: the Catalina Flying Boat, the Boeing Fortress IIb, and the two destroyers, H.M.S. Campbeltown and Bligh that were Lease-Lend ships from the U.S.A. to Britain in the Second World War.

H.M.S. Campbeltown was the ship used to demolish the dock gates at St. Nazaire in the famous raid of that name. For the modeller she provides a fine example of the old "four stack" American destroyers, so many of which were used by Britain during the war. H.M.S. Bligh is a different class of ship. Whereas Campbeltown (launched in 1919) was an old ship by the time she was transferred to the Royal Navy, H.M.S. Bligh (launched in 1943) was handed over to the Royal Navy immediately after trials.

Both of these ship models are claimed to be correct down to small details of depth charge racks, stanchions and rails, winches and radar aerials. The plastic mouldings are very complete with a wealth of moulded in detail.

The model of the Catalina, and that of the Fortress, are in white plastic with clear canopies, with details of pilot figures, joysticks, rotating gun turrets and guns, wheels, including the beaching gear for the Catalina. On the Fortress the undercarriage retracts, and the main ailerons, elevators, and rudder move. Bomb bay doors open to reveal the deadly bombs in their rack. Both the Fortress IIb and the Catalina are intended to be in Royal Air Force Coastal Command colours and are provided with R.A.F. Coastal Command identification decals to suit this colour scheme. All these four kits retail at 73p each.

The fifth model to be released from Revell is a model which consists of four aircraft. An addition to Revell's small range of composite aircraft kits of this kind, this kit represents the Blue Angels flying team in their Phantom 4J Jets. The kit is complete with a special stand to display the four aircraft in flying formation. The models themselves are made of blue plastic and provided with complete sets of decals so that little painting is necessary. When made up they produce a very impressive ornamental display, capturing something of the thrill of the close formation flying for which the real Blue Angels Flying Team of the U.S. Navy is so famous. The retail price for these is £1.51.

For those who don't know enough about the Blue Angels (better known in the U.S.A.), the squadron gave its first public demonstration on June 15th 1946 in World War II Grumman Hellcat fighters. In 1950 they stopped their public performances to become an operational squadron in the Korean war aboard the U.S.S. Princeton aircraft carrier. In 1951 they were again performing in public. They have used a number of aircraft, and made the step to the Douglas F-4J Phantom II in 1968.

Latest "Matchbox" Releases

Two new Superfast cars. Making a change from dragsters and high performance models this month from Matchbox is the futuristically designed ambulance, No. 46 Stretcha Fetcha. This model resembles a real ambulance in that it is finished in white, has a red cross on the side and is complete with two roof-mounted blue lights. The bodywork is very open allowing for large areas of tinted blue glass which is misted in the passenger compartment. The rear door is hinged at the top and opens to reveal a cream interior complete with a patient.

The second car is No. 51 Citroen SM. This car has the classic Citroen shape although it is a new model. The power unit for the SM is by Maserati, which guarantees a good turn of speed. The bonnet has the usual low line of the Citroen but the back of the car, which is tapered, is very square. The two doors open and the model comes complete with a towing hook. These two models retail at 16p each.

New "Model of Yesteryear". The latest model to join this range is the Y-16 Mercedes Benz "SS". Like the other 15 models in this series of models from motoring's golden age, the detailed finish is superb. The coachwork is sprayed in metallic silver and the running boards/wings are finished in metallic red. The bonnet incorporates a series of air vents and from the right hand side three exhaust pipes emerge. These join into one exhaust system which runs underneath the car. The roof is detachable, and when removed reveals an engraved dashboard. Further examples of Lesney's detailed finish are the sump and gearbox underneath the car, and of course the Mercedes emblem on the front of the bonnet. Retail price is 49p.

Racing Cars. Following the announcement of Lesney's motor racing sponsorship is the introduction of two racing cars to the Speed Kings range.

The exciting new **K-34 Thunderclap** model is sprayed in bright yellow. The bodywork has current Grand Prix styling and incorporates an upswept rear aerofoil. Helping make the model look authentic are the Matchbox, Firestone, and STP racing stickers. The whole of the area behind the driver is taken up by the extremely powerful looking V-8 engine.

The second model is the **K-35 Lightning,** and this one is finished in a striking red. The bodywork is leaner than the K-34 but has a higher rear aerofoil. The driver in the cockpit is protected, in the event of accident, by the roll-over bar. Tyres are of course the wide no-tread racing slicks. As on the K-34 the power unit is a V-8 with a chromium finish. Both these models retail at 49p each.

New Super King. Making a heavyweight entry into the Super Kings range is the K-5 Muir-Hill Tractor and Trailer. This robust model comes in two parts and the tractor and trailer units may be joined together with the special coupling. The whole unit is sprayed in yellow and the chassis of the trailer is finished in red. The trailer unit has a tipping body and the shovel at the front is reversible. Further details to add even more value to this big action model are the chrome sprayed engine and the giant-size tyres. Retail price is 73p.

Providing exciting new areas for play with "Matchbox" models are two new Play Action Sets. Each set comes complete with a colourful printed cardboard layout, glue for assembly and "Matchbox" models. Not only are these sets fun to play with, but they will also provide a lot of pleasure during construction.

P-1 Stunt Cars. This set will really put the "Matchbox" models through their paces. Using the Thunderbolt Launcher the cars can be shot through the fireball, over the sky-jump or crashing into the target. Three Superfast models are included with the set, these being the Baja Buggy, Lotus Super Seven and Hot Rod Jeep.

P-3 Load-a-vator. This set makes up into an exciting quarry site with a working hopper and chute. The Load-A-Vator is complete with plastic granules that can be moved around the site. The granules are unloaded from one of the tippers and moved on to the grab using the bulldozer. The grab is then raised and the granules fall into the hopper. The waiting tipper truck may then be filled. This set also contains three vehicles, a Case Bulldozer, 8-wheel Tipper and Dump Truck. Each of these sets retails at 97p.

2nd GREAT Model Railways EXHIBITION

24 AUG
to
2 SEPT
(Not Sunday)

£250 in PRIZES

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OUR EXHIBITION

The MODEL RAILWAY EXHIBITION comes at the traditional beginning of the model railway season and we shall be once again taking Central Hall, Westminster, over the Bank Holiday period to promote an exhibition devoted to the smaller gauges of Model Railways. This strikes a new note in that it is at the beginning of the modelling season rather than the end. It lasts for nine days, which includes two Saturdays and a Bank Holiday Monday so that we feel there should be a great opportunity not only for enthusiasts to visit us, but for many in London, perhaps on holiday, who would not otherwise have had the opportunity.

TRADE STANDS

A number of proprietary exhibition layouts (of international calibre) will be on display. The model railway trade will be in strength offering a wide range of goods. Firms and manufacturers whose goods will be on sale and on display already include: Beatties of London; Chuffs; A. A. Hales Ltd; Studiolith; Traction Engine Enterprises; Plaistow Pictorial; M. & R. (Model Railways) Ltd.

GRAND LAYOUT COMPETITION

We are offering prizes of:
First Prize £50, Second Prize £30, Third Prize £20, for the best club *and* for the best individual layout £200 in all! The layouts displayed will be limited to 200 sq. ft. which gives a maximum size of about 16 × 12 ft. Gauges eligible will be O gauge and smaller gauges.

How to enter is simple—a club or an individual has only to drop us a line and send a photograph of the layout; if possible a rough sketch/plan and a note of dimensions and special features. We will visit layouts which seem likely to be of interest and make our choice from them.

OTHER COMPETITIONS

STATIC DISPLAY MODELS: O GAUGE & SMALLER.

£50 in prizes which will be divided into prize units of £10 first prize, £7 second prize, £5 third prize and miscellaneous additional awards to a total of a further £28.

BEST LOCOMOTIVE—ROLLING STOCK—LINE-SIDE FEATURES—LOW RELIEF BUILDINGS (group of three)—STATION BUILDINGS—POINTS & TRACKWORK.

SOUVENIR HANDBOOK & GUIDE—

MODEL RAILWAYS comes out on August 11th and will contain a special Exhibition Souvenir Handbook and Guide Supplement and provide a grand enlarged number.

ADMISSION—

Hours of Opening—The exhibition will be open on the 24th August 1972 at 10 a.m. and will continue through daily to 9 p.m. except Sundays when it will be closed, and will finish on Saturday, September 2nd at 7.0 p.m.

Prices of Admission—Price of admission at the door will be 30p adult, 15p child.

Reduced admission charges for pre-booking as under:—Single and small number pre-booking tickets available from these offices. Adult 25p, Child 12½p. Parties of more than 10: Adult 20p, Child 10p. Teachers i/c parties free—one per 10 in party.

A combined family ticket can also be bought in advance.

Enquiries to Exhibition Organiser, Model & Allied Publications Ltd., 13/35 Bridge Street, Hemel Hempstead, Herts.

MODEL & ALLIED PUBLICATIONS LTD.
13-35 BRIDGE STREET, HEMEL HEMPSTEAD, HERTS.

CLASSIFIED ADVERTISEMENTS

continued from page 466

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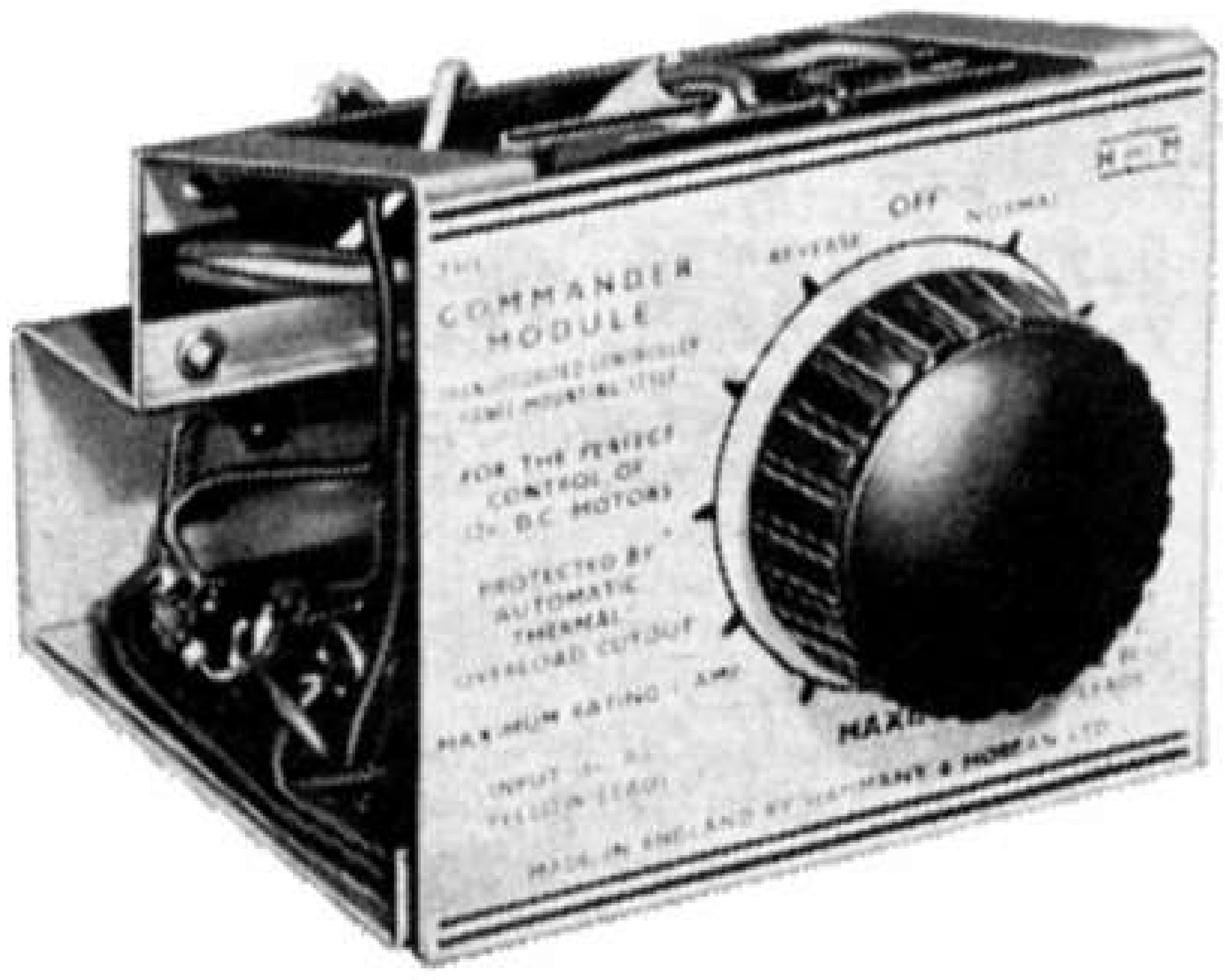

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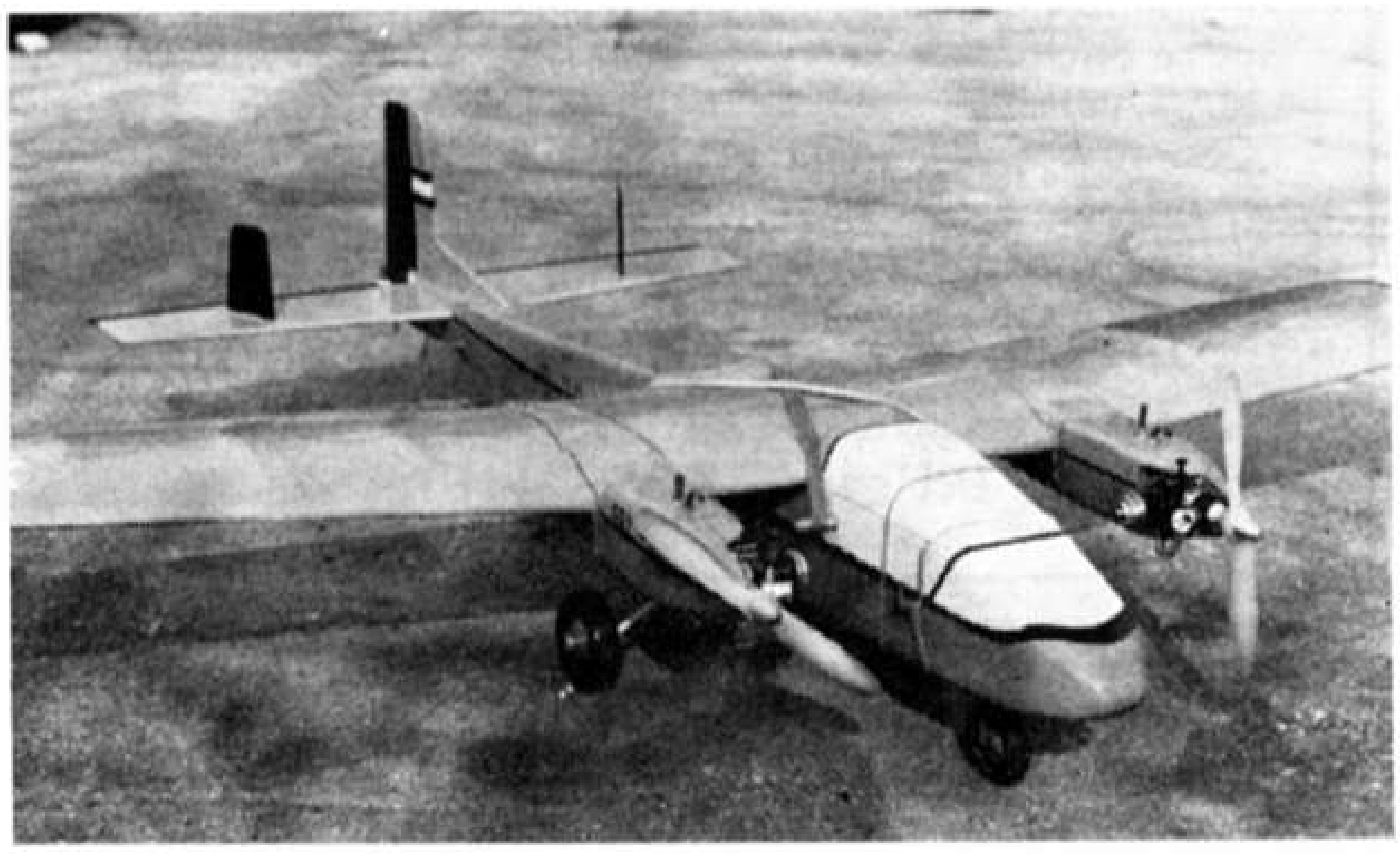
Radio Models



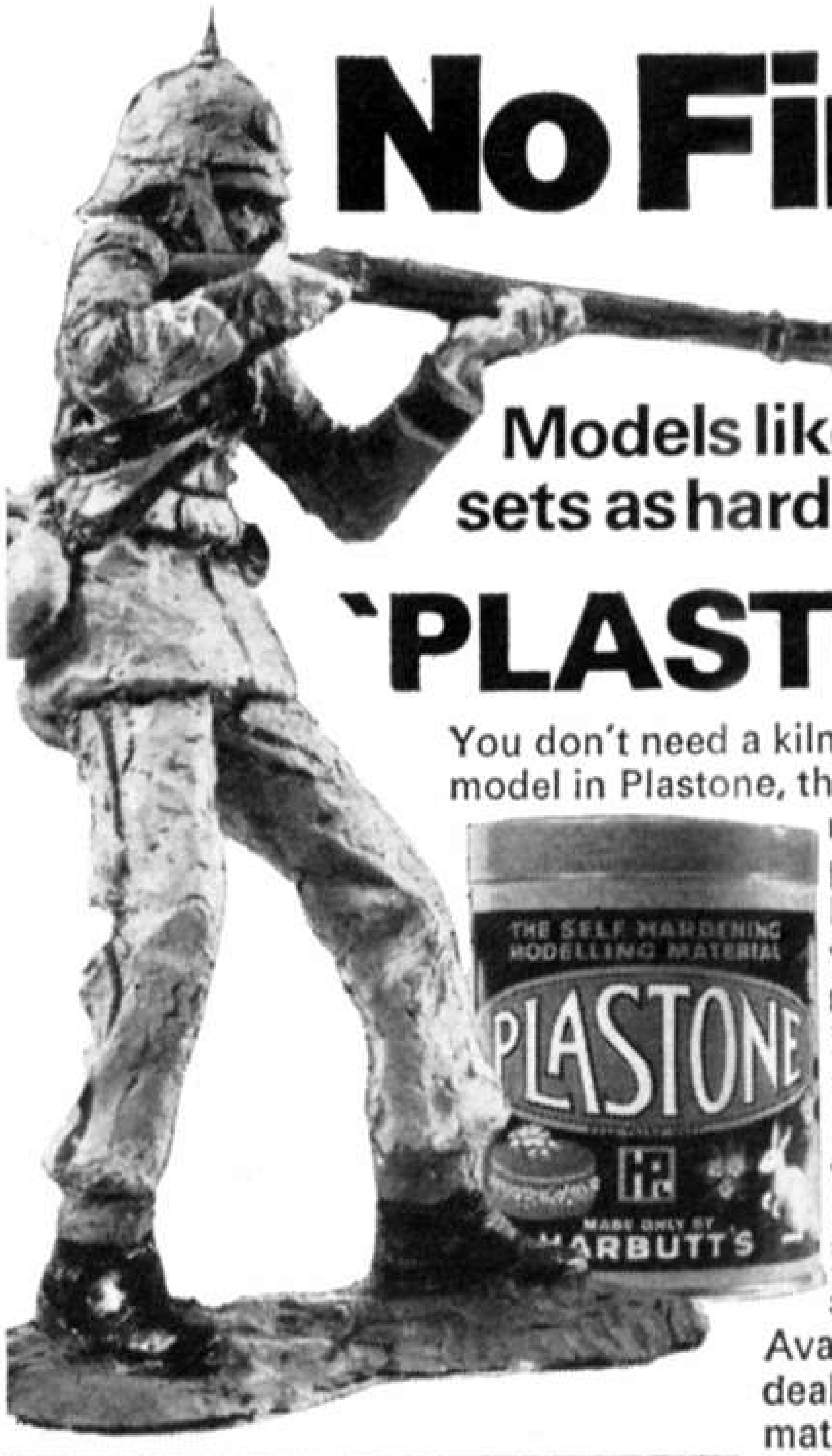
Multi engined R/C model aircraft have always been a tantalising subject for radio control modellers. Many have been the experiments along these lines, and many have been the failures. September R.C.M. & E. carries plans for a proven twin engined R/C aircraft design which can be flown on either single or multi channel R/C systems. Called TWIN-KLE, this simple and compact design spanning 0.47 ins. offers sparkling performance on only a couple of Cox 0.049 motors.

Other features this issue include kit reviews of the RipMax Spitfire and the Solarkraft Nebular and *Wave Lengths*, our bi-monthly R/C boating column which now returns with a new columnist at the helm.

SEPTEMBER ISSUE ON SALE AUGUST 11th

From newsagents and model shops or direct, price 20p + 3. Model & Allied Publications Ltd., 13-35 Bridge Street, Hemel Hempstead, Herts.

No Firing



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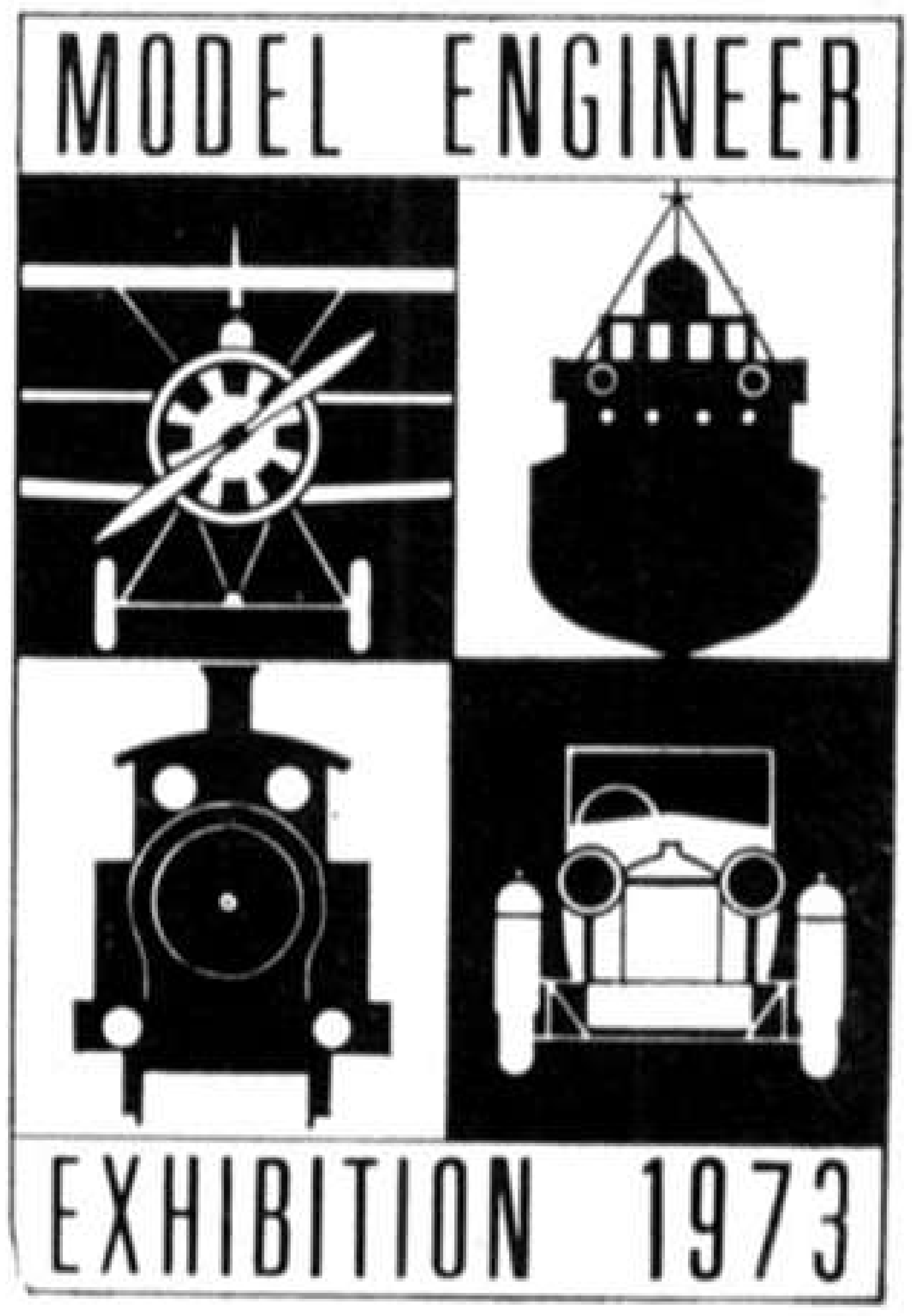

42nd GREAT SHOW!

SEYMOUR HALL, LONDON, W.I.

2nd January — 13th January 1973

(Not Sunday)

Daily 10 a.m.—9 p.m.: 2nd Jan. opens 2.30 p.m.; last Sat. closes 7 p.m.

Model Aircraft, Locomotives
Boats, Traction Engines
Military Models, Crafts

COMPETITORS

£300 in prizes . . . some 30 cups, trophies and other awards. Championships Cups for permanent retention. A win confers "Expert Status!" Special! New S.M.E.E. presentation: Edgar Westbury Memorial Challenge Trophy.

ENTRY CLASSES

Examples of every form of modelmaking activity can be entered. Model engineering masterpieces such as locomotives, traction engines, aircraft, boats, cars . . . or simple plastic creations . . . there is a class for you. Classes include Military Models (six classes) and Craft entries (Furniture, glass fibre, etc.).

WHAT WILL BE ON DISPLAY

Last year's OPEN PLAN arrangement of the MAIN HALL was so widely praised that we are continuing this general scheme with even better access and viewing, whilst retaining the concourse round the WINNERS PODIUM – (This year we hope winners will fit this stand!)

A slight change in S.M.E.E. WORKSHOP will allow spectators better viewing without blocking a door. "Bill" Carter will again be in charge of the S.M.E.E. PASSENGER RAILWAY with non-stop service during opening hours for young and old. The team of experts from the Society will be providing practical work and advice to visitors.

LARGE FLYING CIRCLE – balcony to balcony – again in operation with even more exciting and expert models, and operators. All-electric models that do most of the things that i.c. powered control line models do. It gets better every year.

TRADE STANDS – We have slightly increased numbers this year in view of increasing demand from exhibitors. These are in MAIN HALL; a few smaller, DEMONSTRATION STANDS in BRYANSTON ROOM will show construction techniques and use of tools.

Introduction of a MODEL ENGINEER WORKSHOP manned by the S.M.E.E. last year proved immensely popular and will be increased in size and scope, again with experts from S.M.E.E. in charge and assisted by M.E. consultants. Working models under compressed air will also be on show.

BRYANSTON ROOM will again be a CLUBMEN'S CORNER with stands manned by the principal governing bodies, plus club unit demonstrations, and some space for trade demonstrations. Popular CLOCK CORNER will we trust again be filled with exhibits and experts in attendance.

LECTURE HALL will house the clubs connected with MILITARIA – British Model Soldiers Society, International Plastic Modellers' Society etc. – and also display the entries in the MODEL SOLDIER classes, including new Special Air Service Trophy entries.

COMMITTEE ROOM will provide regular 50-seat sessions for BATTLE GAMES on announced themes with expert commentary. Advance booking by ticket at the exhibition.

BOATING MARINA. Following last year's successful launch of this feature some improvements will be made to spectator accommodation. Timed sessions will be held. TRADE DEMONSTRATIONS of RADIO CONTROLLED BOATS will be welcomed (please let us hear early) which will be varied with CLUB EVENTS (mainly in evenings) and STAFF EXHIBITS. There will be no selling at the poolside, but demonstrations can be announced and suitable display cards shown advising visitors where products obtainable and information given. Club features or displays specially invited – drop us a line!

GALLERIES provide sitting out space for several hundred persons, and offer best view of model aircraft flying. There will also be club exhibits displayed and entries in our BOY'S EXHIBITION.

SOUVENIR GUIDE

Another CHRISTMAS EXTRA issue of *Model Engineer* will be coming out 2nd Friday in December with entries, trade stands, articles galore to assist the visitor and solace the stay-at home.

PRIZE POOL ALLOCATION

Classes attracting six or more entries will enjoy prizes to value of 1st £5; 2nd £3; 3rd £1. With over 12 entries 1st £7; 2nd £4; 3rd £2; 4th £1. Classes under six will have 1st & 2nd only, or at discretion of the judges may be combined with other classes.

REFRESHMENTS

Snack Bar in the Balcony Cafe, with teas, soft drinks, sandwiches, cakes, Restaurant Service (licenced) available on ground floor. Parties may book in advance.

ADMISSION

Price of admission at the door will be 30p adult, 15p child. A child is regarded as anyone still at school. Children under 5 who have not started school and are accompanied will not be charged.

Reduced admission charges for pre-booking as under:

Single and small number pre-booking tickets available from these offices. Adult 25p, Child 12½p. Parties of more than 10: Adult 20p, Child 10p, Teachers i/c parties free—one per 10 in party.

A combined family ticket can also be bought in advance.

Advance Bookings and details from:
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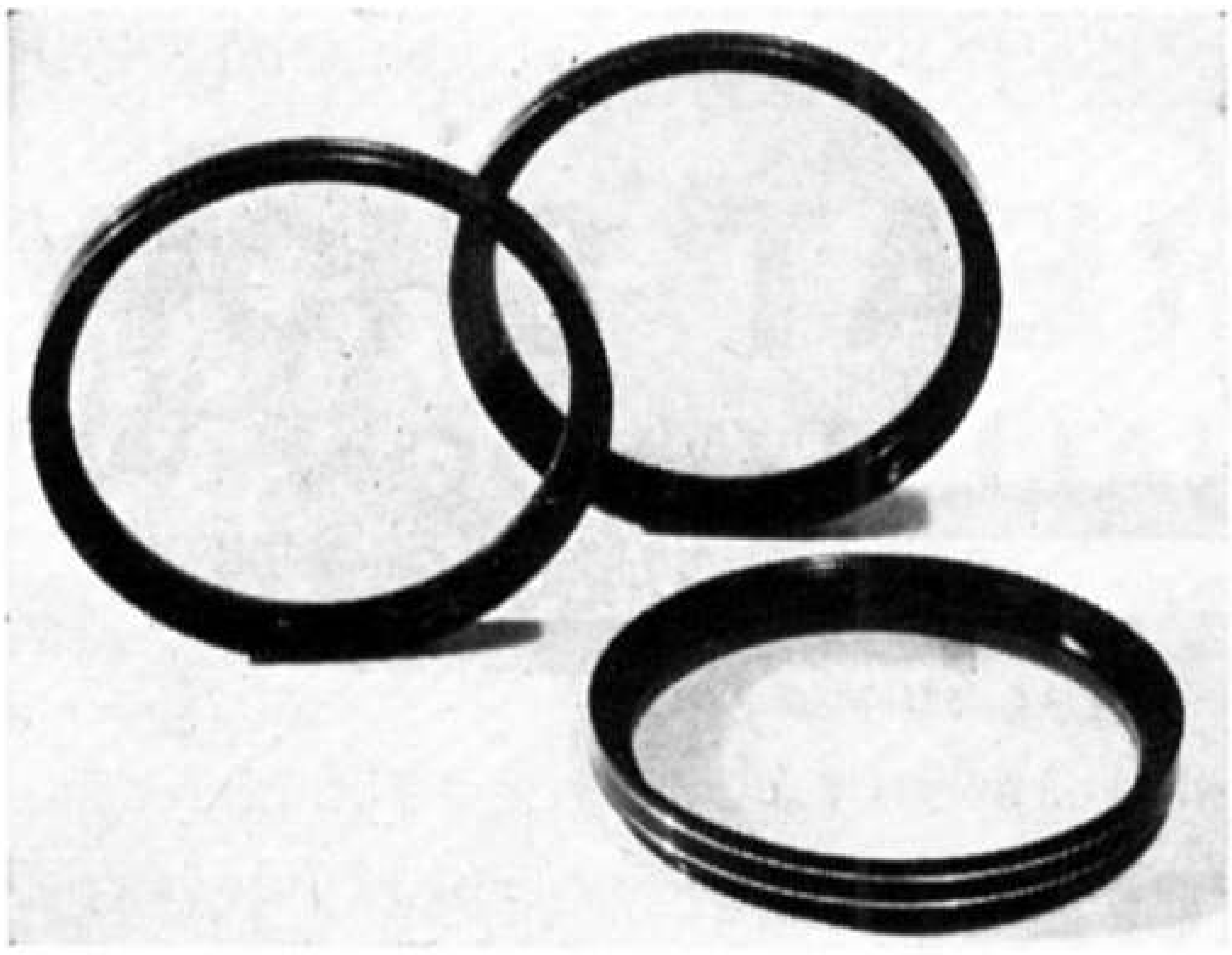

FOUNTAIN FILTERS

THIS IS THE FIRST of a series of special offers that we are making available to readers. In every case they will be useful items made up for us alone: they may, as with these filters be accepted as universally useful, or, they may be experimental items that we consider of particular merit....

These filters have been selected specially for us by a manufacturer of world renown and are packeted under our Fountain badge. The selection offered provides the most useful and widest coverage for a variety of uses... Suggestions for extensions to this range will be welcomed.

SKYLIGHT This is of universal use for colour people – it cuts back excessive blue and reduces haze . . . sometimes called a UV or ultra violet filter. Can be left on lens permanently when it acts as clear cover.

YELLOW/GREEN For black and white operators this one helps to produce those nice white cloud effects. It also lightens dark, grassy areas.

CLOSE-UP+2 A most valuable lens to enable you to come closer for a picture of your favourite cactus in flower; your latest model; brings up to 15 in. in range.

PRICES 49 mm. size **£1.60** each inc. postage. 52 mm. size **£1.75** each.

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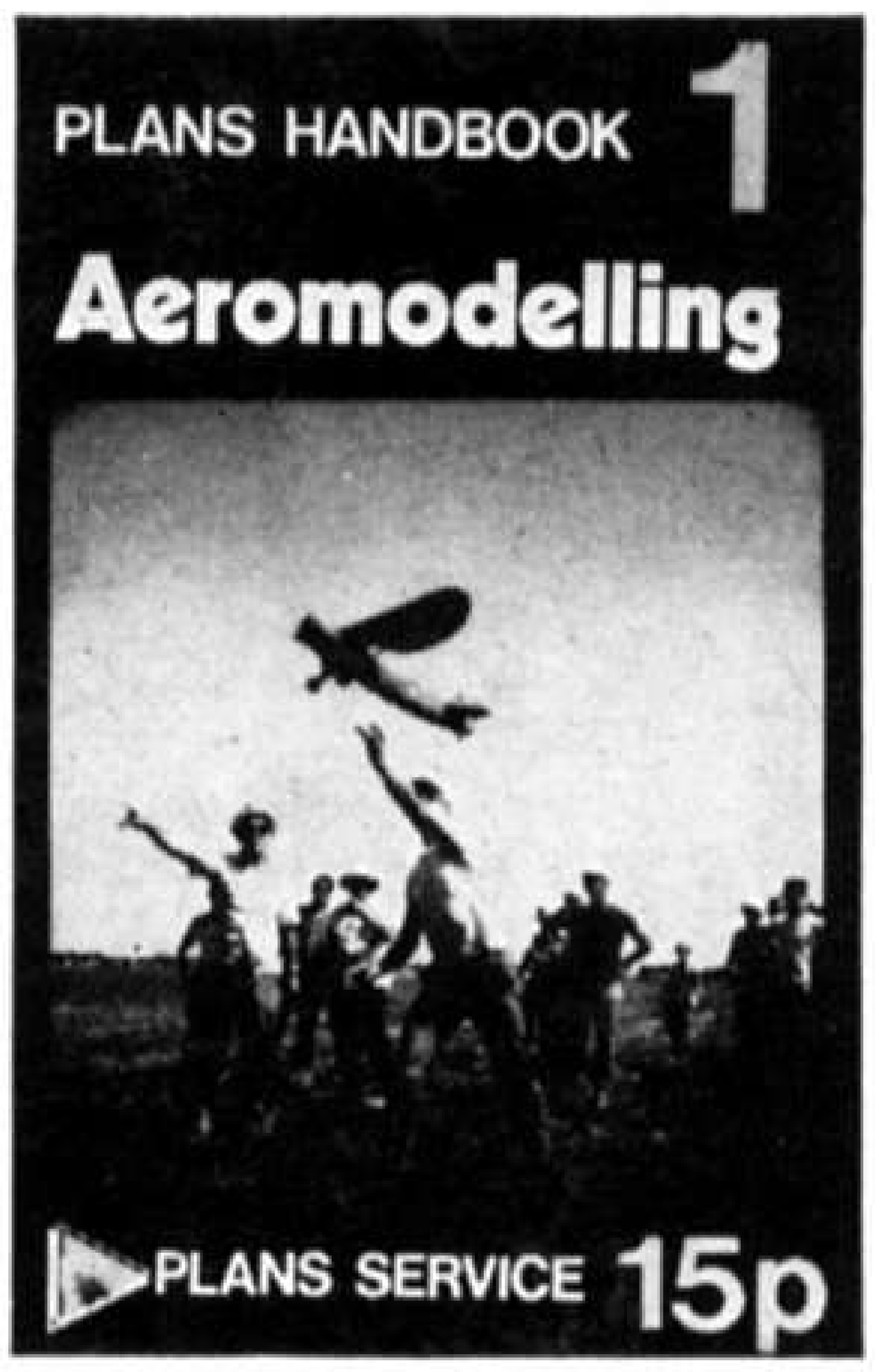
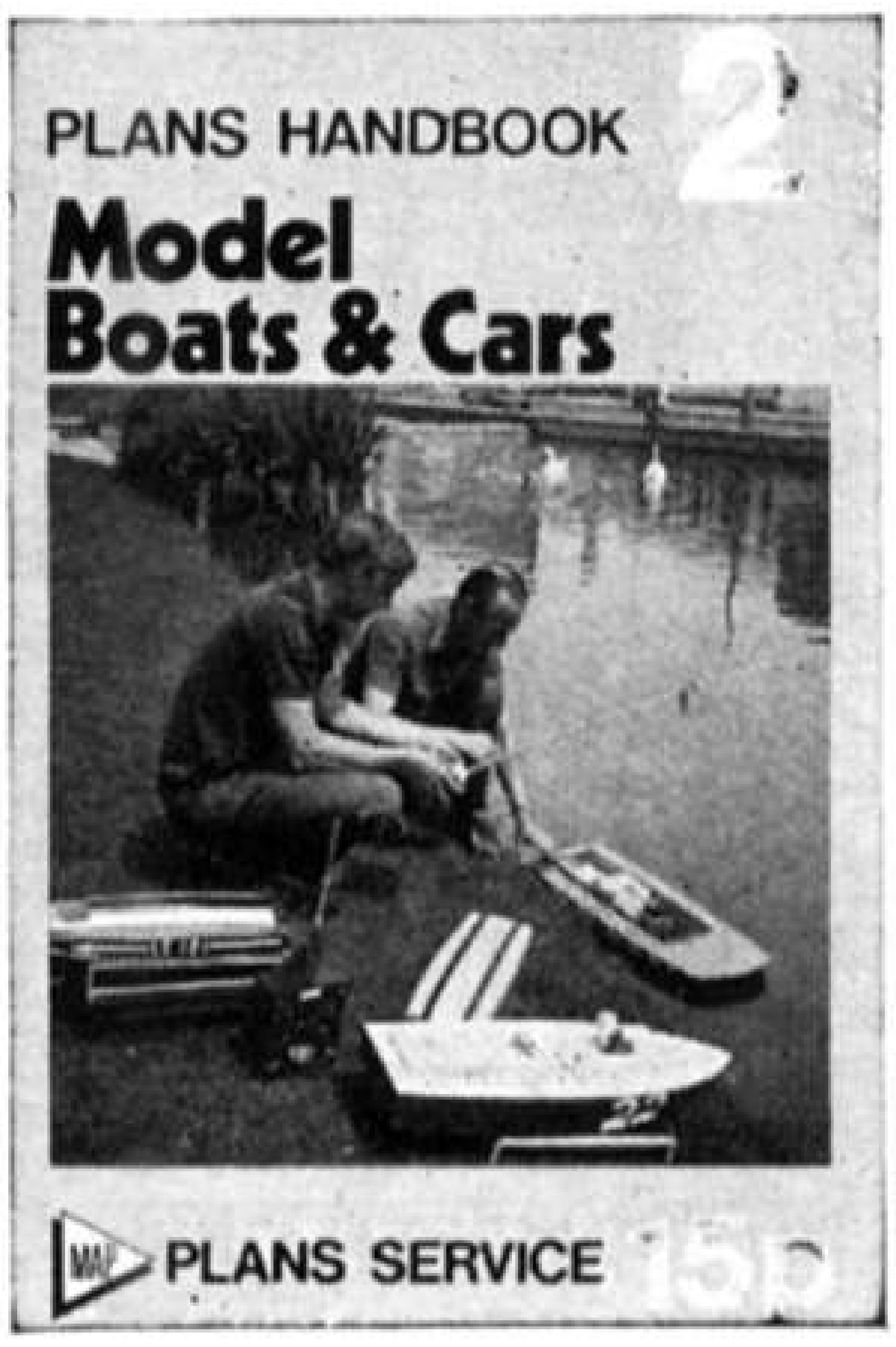
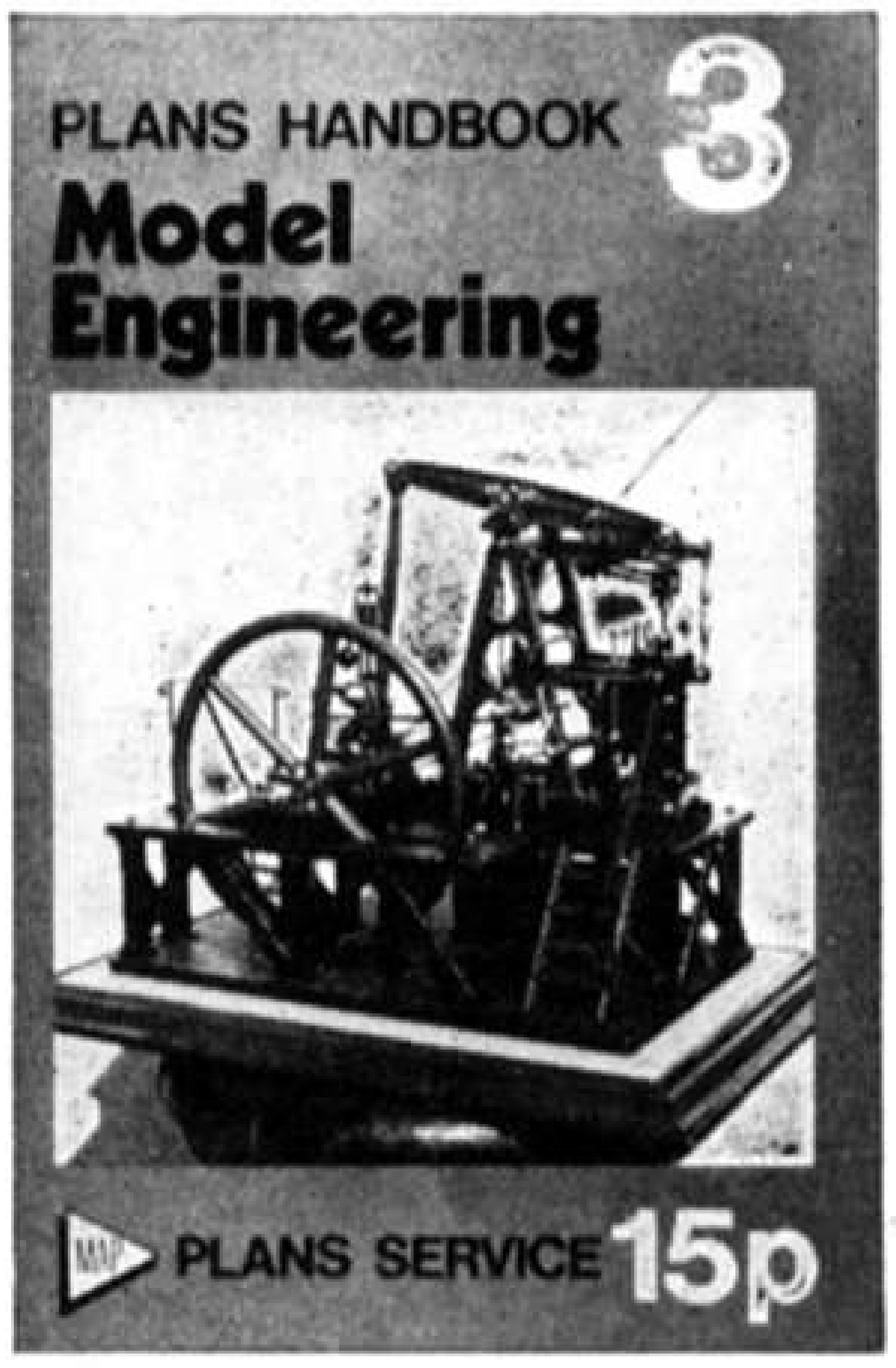


Aeromodelling
128 pages featuring hundreds of working model aircraft, illustrated almost entirely by photographic reproductions of the actual models, plus span, brief description and graded for ease of construction; also selected engine list with tabulated data; index to illustrated plans, X list of vintage unorthodox novel plans, many other classifications, useful articles, order forms. Also good selection of trade advertisements.



Model Boats & Cars
96 pages of plans of scale and semi-scale ships, tugs, lifeboats, submarines, paddle steamers, period ships, racing yachts, hovercraft, cabin cruisers, mostly illustrated, fully described, and classed for ease of building. Working model cars and usual vehicles are included and the very range of scale car drawings, racing cars, ancient and modern. Index of drawings; useful articles on building; water line plans; trade advertisements.



Model Engineering
96 pages of working model drawings for steam locomotives, traction engines, steam engines, petrol engines, workshop equipment from LBSC, Westbury, Evans, Maskelyne, Bradley, Hughes. Plus useful model engineering information, screw-cutting tables, standard threads, letter and number drills, wire and sheet metal gauges, miscellaneous information.

Radio Control Models
96 pages of R/C plans of models and equipment. There are 128 R/C aircraft, all illustrated, including S/C Sports Models and Trainers, Galloping Ghost Models, Competition Aerobatic Models, Multi-Sport and Trainers, Pylon Racers, S/C and M/C Scale Gliders and Soarers, 87 model boats suitable for radio control, plus do-it-yourself R/C systems.

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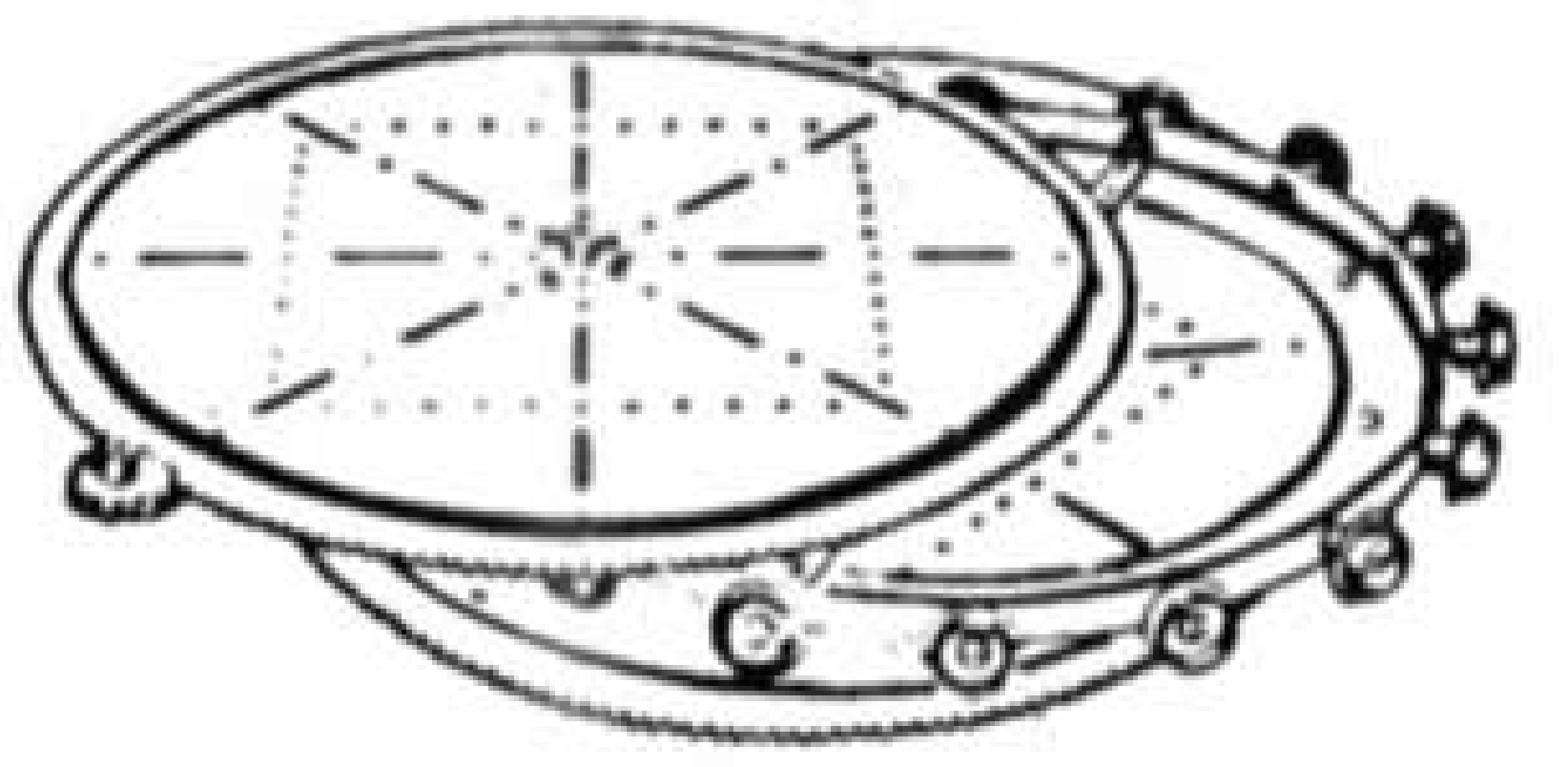

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